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The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

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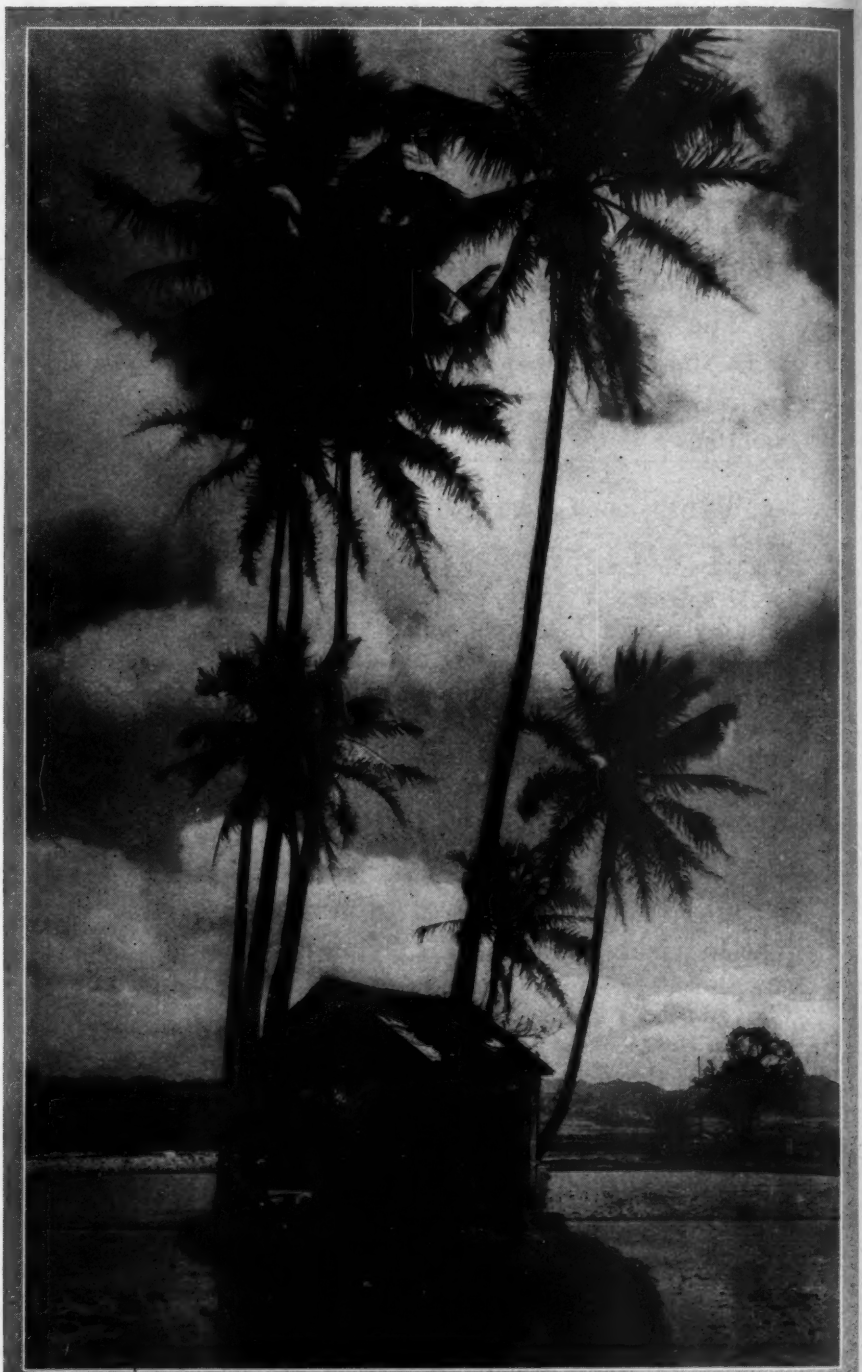

STATELY PALMS PROTECT AND BEAUTIFY THIS RICE FARMER'S HOME IN HAWAII.

Better Crops with Plant Food

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Is Your Mind Open to—

Veritas

By Jeff McDermid

IN these days of propaganda, competition, and facial calcimine, hunting for the truth is as difficult as nailing the lie that George Washington never told. The only invulnerable truth that I am positive of is that my suit is shiny and taxes are due tomorrow, plus the comforting truth that I am still married to the original girl who took me for worse and made me better.

How we used to laugh at those Irish fairy tales which often ended some extravaganza of fancy concerning the brownies and "leprecauns" by saying: "And the truth of what Patrick saw is easily proven by looking at the very same knot-hole in the self-same linden tree where he saw the little folks come forth, between nips on the same old jug that's standing right there ferninst ye!" But with a constitutional taboo extant against the vintage route to visions, many of us are letting our imaginations get prohibited, too. Pure imagination may actually serve as the usher-in of truth, the mental John the Baptist crying for mankind to make room for Greater Things.

Copy-books and well-meaning maiden aunts have been responsible for sadly mixing up the essence of pure imagination with the decoction of miserable lies. It's mostly all in the same bottle now, and infant minds are warned strongly against imbibing it.

NOW that it's all blended together in the old family medicine chest, we occasionally see the victim of sly swigs of it, and suffer much by his palpable effrontery. I have such an acquaintance who has quaffed deep from this mixed dosage since his youth. Nobody told him the difference between a white lie and a vision. He never harms anyone; but he simply chatters on, building his air-castles and trying to make you believe he lives in one of them and rents the rest. Instead of getting nicely exhilarated, his mind is completely soused. Somebody mixed his mental draught for him.

They used to tell me that the chalky specks on my finger-nails were caused by telling white lies. I didn't believe that the system worked to perfection because if it had there would have been no pink whatever beneath my nails; but they never took much pains to point out what the outward signs of a decent imagination consisted of.

How any of our best poets and artists, scientists and inventors ever escaped the homeopathic antidotes against an active imagination, after they had bootlegged some of the pure quill, is beyond me. It's lucky they did, or we would still be devouring Uncle Tom's Cabin by kerosene lamplight while somebody satisfied our musical sense by money-musking on a squeaky catgut.

Strange, isn't it, that the same Sunday-school teacher in mitts and ringlets who could have explained that maybe Jonah didn't explore the whale was never shrewd enough to point out that poetry and imagery are what help make the Bible the world's best seller? If she had given us some of the pure juice instead of so much mixed liquor, maybe we wouldn't be too cross-eyed to recognize the truth when we stumble over it.

A dash of imagination in history has been used with discretion. Take G. Washington again. Last summer I spent a day doing Mount Vernon with a party of eighth graders from my native heather. Fresh from legendary history, these boys looked madly but in vain for the stump of the cherry tree, that emblematic but fabled monument of a boy's love of truth. One eager lad, bent upon discovery, rushed up from the bank of the Potomac and said with breathless zeal, "That river is half a mile wide at least; and if General George ever threw a rock across it, there were some mighty good fellows hired to lie for him."

AND yet, after all, I am like a lot of us mellow chaps who have come to the conclusion that if there is any real hard-boiled "de-bunking" to do let us respect the memories of our heroic dead and turn our attention to the rascals who are making history now. I can stand a heap of veteran tales of the hard-tack and long marches of the Civil War, or the grandsire stories of pioneer difficulty —salted to suit, but swallowed with a smile. But when somebody tries to unload travesties and monstrosities of present-day conduct on my narrow-gauge line of thinking, it's almost more than the traffic will stand. With or without Bill Thompson of Chicago, we can resolve in February (although a little late) to do our daily dozen in keeping the history of 1931 as straight as we can keep it. Bill seems to think all the trouble about history and its distortion is in the text-books, but I think the citizens are more to blame than the professors.

It's the living lie rather than the

(*Turn to page* 60)

Potash Insures Tomato Quality

By J. L. Baskin

Atlanta, Georgia

"THINGS are changing here in Georgia," remarked A. R. Royal, manager of Seaboard Farms at Ambrose, one day as he supervised the harvesting, hauling, grading, and packing of some six to eight hundred crates of tomatoes.

"We don't farm as we used to, and many of the changes we have made have been a matter of necessity rather than choice."

He waved his arm out in panoramic fashion over the broad field representing upward of 300 acres of tomatoes now being harvested, and said, "Ten years ago all this land was growing cotton year in and year out. I suppose it would be growing cotton today had the boll-weevil not come along and made cotton growing more hazardous and less profitable for most of us.

"But there are thousands and thousands of farmers throughout Georgia, and the South for that matter, who are continuing to put most of their 'eggs' in the cotton basket. The failure to adjust farming to this new and changed condition is the primary cause for many Southern farmers' condition today. I do not wish to say that Georgia and the South have not made great strides during this period of readjustment, for they have. For instance, Georgia farmers are now growing upward of 100,000 acres of bright tobacco on fields that were temporarily laid waste by the boll-weevil. Then, too, many Georgia farmers have made great progress in fighting this billion-dollar bandit to a point where cotton

This wagon-load of tomatoes in picking baskets on the way to the packing shed is from a field which received a final application (side-dressing included) of approximately 1 ton of 8-4-10 (PNK).

growing is profitable under a program of intensive fertilization and cultivation.

"This 300-acre field that you see here today represents a part of our answer to the oft-propounded question, 'What are you going to do about the boll-weevil?' I think you will agree with me that we have answered it rather well, not in mere words but in a practical way that has brought greater profits on our investment than cotton growing ever did."

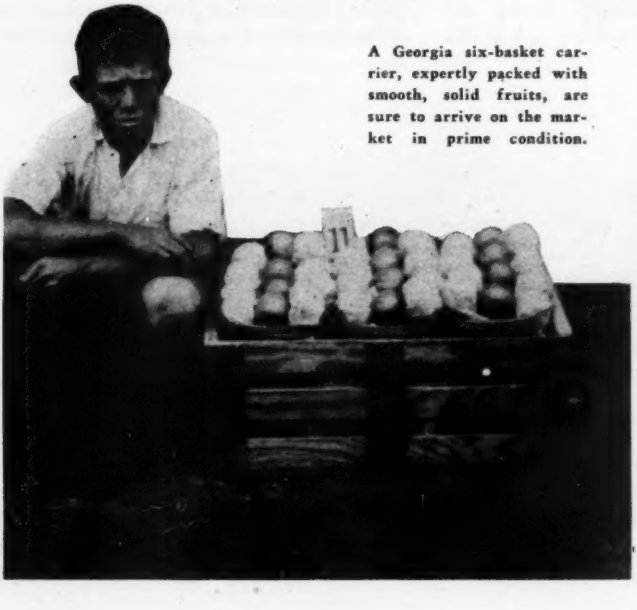
After visiting the packing shed and observing the train of wagons and teams constantly plying back and forth between the fields that were now being harvested and the packing shed, and after carefully observing every phase of the process that took place—from the delivery of the fruit from the wagons into the huge grading bins, thence over the grading and sizing belts where they fell in assorted sizes and were wrapped and packed into Georgia six-basket carriers—I was convinced that Mr. Royal was a good executive as well as a good superintendent.

The packing shed was of daylight construction admitting plenty of light necessary for the graders and packers that were at their posts of duty ready to take care of the constant stream of fruit that was passing over the belts and falling, assorted, into bins. As we came out of the packing shed, Mr. Royal chanted a few words to the negro drivers who always welcome a chance to "loaf" while the wagons ahead unload. His remarks were as effectively carried out as would be the orders of a sergeant-major in the British army.

The Whole Story

At this moment Mr. Royal excused himself, but the writer, anxious to get the whole story, followed him. He approached the wagons waiting at the shed to be unloaded, each wagon having approximately 50 field baskets, glanced over them with his trained eye and instructed his field foreman to give Numbers 11, 19, 27, and 42 more careful instructions about picking. The pickers, 150 strong, have numbers and when they fill their field baskets they place their number on top in plain view. By using such a method it is easy to locate who is picking the small ones or the green ones or is failing to do sufficient field culling.

The thing that impressed me was the fact that Mr. Royal not only knew every phase of tomato growing from plant bed to tacking on crate covers, but he knew the all-important and seldom-mentioned knack of how to get the most out of labor and at the same time keep them happy and contented.



A Georgia six-basket carrier, expertly packed with smooth, solid fruits, are sure to arrive on the market in prime condition.

High noon with its usual dinner hour was fast approaching. I knew the farm well enough to

know that farmers and farm labor never get too busy to eat, and so I hastened to get "the meat of the cocoanut" as it were, covering the how and why of tomato growing. Right here I borrowed some of Seaboard Farms' time, for I led Mr. Royal down south of the packing shed to a point where some empty crates were stacked. By temporarily diverting his mind from the near-by operations of picking, hauling, grading, and packing, I managed to get the following story.

Heavy potash feeding encourages early and heavy fruiting.

"We have been in the tomato business on a commercial scale for eight years," he related. "At the start we tried to grow tomatoes as we had grown cotton—with little fertilizer, little attention, but large acreage to more or less make up for our other shortcomings.

"For two years we didn't stake our tomatoes. We soon found that it was not a matter of how many tomatoes we produced, but how many of good enough quality to stand up on the market and bring top prices. We do not claim that our method of growing tomatoes is based on any secrets, rather it is merely a combination of all the factors that have helped us grow better tomatoes each year. We have tried many varieties, methods of cultivation, and fertilizing programs and have abandoned them because they were unsatisfactory. What you find us doing today can be improved upon I'm sure, but in its present form it will produce large yields of merchantable tomatoes that will give the grower a good chance to make a profit.

"We grow our own plants in hotbeds. Sometimes we drill the seed into spotbeds directly, using large amounts of 8-3-5 (PNK) well mixed with the soil. We always try to have, and in the past have had, a superabundance of strong, well-rooted, partially hardened plants to go to the field about April 15.

"Two weeks prior to setting, we apply 1,200 pounds of 8-3-5 fertilizer in the row and make a slight ridge because our soil is flat and the water furrow will take care of heavy rains. We plant in five-foot rows, spacing plants 24 inches apart in the row. This requires, 4,440 well-grown plants per acre. As soon as the plants are well established and a full stand is obtained by a small amount of resetting, we use a 32-inch split pine stake to support each plant. Immediately after staking and before the plant grows sufficiently high to 'lop over' we tie it to the stake as far up the plant as

possible. We continue to re-tie as the plant grows. We practice rigid and continued pruning, removing all suckers that appear in the axil of the leaf above the fruiting bands.

"Soon after staking and at the first working, we side-dress with 400 pounds of 8-3-5 per acre, and in a few weeks we side-dress with a mixture of 100 pounds of soda and 200 pounds of muriate of potash which gives us a 300-pound application of 0-6-33. This is pretty high in potash, but we have found that to grow the greatest yields of best quality tomatoes we must keep the nitrogen to a minimum to get the desired growth and use just as much potash as we can so our young fruits will develop normally and free from wrinkles and folds into solid, smooth fruits of good size and appearance.

Potash Gives Extra Quality

"We do not mean to say that nitrogen isn't valuable for it is. We use a lot of it, but we necessarily watch our nitrogen to prevent the production of puffy, ammoniated fruits that will in some instances be too large and will therefore be undesirable for shipping. Our customers buy more and more on how well they were pleased with our shipments last season, and naturally we want our fruit to stand up and have finish. Potash gives this finish and extra quality. We intend to use even more potash on our richer lands next year.

"The tomato, as you know, has a very local feeding area and is dependent on the plant food and water near its roots. We use all our fertilizer either in the drill or side-dressing and we work the dirt toward the vines to conserve all moisture possible. We plant the selected Gulf Coast Market which is a very prolific variety that fruits early. On account of its prolificness, it must be fertilized liberally. Our fields finally get, all applications included, approximately one ton of an 8-4-10 per acre. We are convinced that some of our soils should have more and we are going to see that they get it next season.

"We consider that an average yield of from 275 to 300 crates per acre is a good yield and will return a handsome profit to the grower. Of course, this is small as compared to some of our acres, but in growing early tomatoes, we talk in crates where growers of canning tomatoes talk in tons. When it comes to talking in dollars per acre, we have the growers of canning stock beat a mile, and it is the dollars we are after.

"Our lands are not improved, for we have to rotate rather often. Worms cause us to throw out more culls than all other causes. We spray with a solution of bordeaux-arsenate, but some years we still lose a great many fruits from worms. However, spraying helps a great deal.

"These farms are owned by H. B. Macklin and his associates. They operate under the title of 'The Georgia Vegetable Growers' and ship all their products under a label bearing their name. In past years the Georgia Vegetable Growers have furnished a number of farmers everything necessary to tomato growing, including plants, seed, hotbed material, and fertilizers. When it comes harvest time, the profits are divided on a 50-50 basis. Harvesting costs, including wrapping, crating, grading, packing, and labeling, are borne equally by grower and shipper. By such a method we have made money for farmers as well as for our firm.

Are Growing Into Business

"We plan to carefully select a few more good farmers each year and grow into business cautiously as fast as the markets demand and are willing to pay for our products. We have tried growing other crops that fit in with tomato growing and have met with limited success. The Georgia Vegetable Growers now operate in Ambrose, Tifton, Douglas, Willacoochee, and Fitzgerald."

The Georgia Vegetable Growers now own and operate 18 large trucks having a capacity of 300 crates or the

(*Turn to page* 58)

Making the Farm and Home Gardens a Cash Asset

By F. C. Gaylord

Purdue Agricultural Experiment Station

This backyard garden 20' x 30' returned $50 worth of vegetables.

BRIGHT-COLORED catalogs with their ever-thrilling story of crisp, succulent vegetables are the harbinger of spring and the advance warning that it is time to begin planning for a real farm or backyard garden. With dollars scarce, labor plentiful, and an abundance of fertile soil as a foundation, why not have a garden to brag about? In Indiana alone we have something like 190,000 farms. Every one if inhabited by a family ought to have a real garden. In addition, we have thousands of city and town folks everywhere who have or can secure a backyard or vacant lot which with plenty of hoe-handle exercise, good judgment, and careful planning will return ample interest for the time and money expended.

But let us stop generalizing and theorizing and consider the garden as a cash asset. Let's forget for the time being the joy of watching fruits, vegetables, and flowers growing, of enjoying crisp, juicy, high-quality products, of healthful exercise, and consider the home and farm garden on the cold, matter-of-fact basis of hard cash returns.

There's E. E. Baker of Veedersburg, Fountain county, Indiana, who had a 60 x 60 foot garden, about 1/12 of an acre. Here's what he grew: four kinds of tomatoes, peas, beans, lima beans, endive, carrots, beets, spinach, cauliflower, besides other common garden crops. He had an abundance for family use—fresh, crisp, succulent, direct from his own handiwork. He sold $41.02 worth, or at the rate of $492 per acre. This with the value of the vegetables used returned him an equivalent of more than $1,000 an acre. Besides he dressed up the lot

at the ends and in amongst the vegetables with zinnias, marigolds, dahlias, salvia, calendula, ageratum, and other flowers.

Now, that much for small gardens. Here's Wm. Smith at Williamsport with a garden between ¼ and ½ acre; that's a farm garden. He grew an abundance of peas, beans, lettuce, onions, carrots, corn, cabbage, peppers, turnips, radishes, tomatoes, spinach, swiss chard, and potatoes for use during the summer, and stored 16 bushels for winter. He also sold $100 worth of vegetables. There you are, $200, on less than a half acre. I have dozens of examples of Hoosier gardeners both in country and town, all showing same results—an abundance of high quality vegetables for summer, fall, and winter with cash sales of the surplus.

The prescription for success is the same for either town or country garden, in Indiana or elsewhere, and the formula is simple. Take Baker, at Veedersburg—his method is typical for the small gardeners, those with limited ground. On his 60 x 60 foot lot he used a two-horse wagon full of manure last year and repeated with two wagons full for 1931. He plowed 12 inches deep and used two sacks of complete, high-grade commercial fertilizer. A fertilizer carrying from 2 to 4 per cent nitrogen, 10 to 12 per cent phosphoric acid, and 6 to 10 per cent potash is best for most crops. He planned his garden and used long rows, repeated plantings to give long harvesting period for peas, beans, corn, tomatoes, etc., and lots of hoe-handle exercise to keep out weeds. Sounds simple, and good seed of right varieties planted on liberally fertilized soil, with good culture, will about 9 times out of 10 return a bountiful garden.

In general the application of two two-horse loads of manure per 50 square feet each year will help insure a real garden. This should be supplemented with a heavy application of complete fertilizer. For a permanent farm garden a good plan is to have an acre plot one-half in garden each year and the other half planted to soybeans, or other legumes, which are plowed under in the fall in preparation for next year's garden.

In addition to stable manure or turning under of green manures, use 750 to 2,000 pounds of a complete fertilizer analyzing from 2 to 4 per cent nitrogen, 12 to 14 per cent phosphoric acid, and 6 to 10 per cent potash. This should be spread over the whole surface and cultivated or raked into the top three inches of the soil. Where manure cannot be secured, the application of the above complete fertilizer at the rate of 2,000 pounds per acre will help insure a real garden.

RATE PER A. EQUIVALENT TO APPLYING ONE POUND TO GIVEN AREA

1	pound	per	44	sq.	ft.	or	10	x	4.4	ft.	=	1,000	pounds	per	acre.
1	"	"	48	"	"	"	10	x	4.8	"	=	900	"	"	"
1	"	"	55	"	"	"	10	x	5.5	"	=	800	"	"	"
1	"	"	62	"	"	"	10	x	6.2	"	=	700	"	"	"
1	"	"	72	"	"	"	10	x	7.2	"	=	600	"	"	"

To find amount in pounds of fertilizer needed for individual garden for any definite amount per acre, multiply length in feet by width and divide result by number of square feet given above for any given rate.

Nitrate of soda or sulphate of ammonia are two common nitrogen fertilizers. These may be used to advantage to hasten the growth of leafy vegetables such as lettuce, spinach, and cabbage. Dissolve one-half ounce in each gallon of water and sprinkle around the plants.

Lime is of particular value in the case of acid soils and heavy clays. Most gardens will be benefited by the application of from 15 to 30 pounds of ground limestone or hydrated lime

to the square rod. Lime sweetens and lightens the soil and by chemical action helps make certain plant foods more available.

Thorough, deep plowing or spading is necessary for proper development of high quality vegetables. The soil should be thoroughly worked as deep as plowed, and a fine, clod-free seedbed prepared. Shallow cultivation after planting gives best results.

Repeat Plantings

The outstanding faults of both the old gardens and those of today largely lie in the fact that vegetables come and go and little effort is made in making repeated plantings to lengthen out the season of our favorite vegetable nor is enough attention paid to growing an ample and varied supply of root crops for the winter.

Such early vegetables as radishes, lettuce, carrots, early turnips, cabbage, kohlrabi, early Irish potatoes, peas, onion sets and seed, beets, parsnips, salsify, spinach, and parsley should be planted as soon as the soil can be worked. Do not delay until late in the spring to plant these crops as they are cool-season crops and cannot be expected to produce high quality under adverse hot weather.

A trial planting of Golden Bantam sweet corn may usually be planted just after the first planting of peas, radishes, and lettuce. Suppose it does freeze, the loss is little, and if it gets by, just think of those juicy ears on the cob along about July 1st. Sweet corn should be planted every week to ten days until July 4, to insure a continuous supply until October frosts. Repeat on peas, planting after Alaska such early varieties as some dwarf sweet type.

Two weeks after the first planting in the garden, string beans may be planted with reasonable safety. Stringless green pods are best and repeated plantings of these every 10 days will lengthen out the bean supply.

It should be remembered, however, that tomatoes are a warm-season crop and will stand but little cold weather. Every year thousands of enthusiastic gardeners lose much money by planting early tomatoes, peppers, and eggplants before the ground has warmed and the danger of frost is past. They are warm season crops and instead of hastening the ripening period, too early planting results in a decided checking of their growth even if they are not killed.

Just as soon as the weather and the ground warms up, peppers, lima beans, sweet corn, pole beans, cucumbers, squashes, pumpkins, and sweet potatoes, as well as melons, should be planted. To plant them earlier is merely wasting seed and time.

For the farm garden the melon

Showing one method of training tomatoes in a vegetable garden.

patches are by far too few in number. Every boy and girl likes sweet juicy cantaloupes and red ripe watermelons and a small plot in the corn field or edge of the garden, liberally fertilized irrespective of the soil type, will produce abundantly. High-grade seed is essential and some of the best varieties of cantaloupes for home use are *Emerald Gem, Lake Champlain, Hearts of Gold,* and *Tip Top.* As to watermelons, *Kleckly Sweet* and *Halbert's Honey* are early, thin-skinned varieties of exceptional quality.

For the small city garden, stick to root crops like carrots, beets, sweet corn, tomatoes, peppers, cabbage, celery, and similar crops that produce a large supply on limited space.

Small gardens can be made to utilize the space to best advantage by practicing companion and succession cropping.

Companion Cropping

In companion cropping, two crops occupy the land at the same time. One of these is usually a small growing, quickly maturing crop; the other requires more space when full grown and has a longer growing season. The smaller and earlier maturing crop is harvested before the other plants become crowded by it. The main crop then has the use of all the space until it matures. Examples of companion cropping are: transplanted lettuce plants alternating between early cabbage and cauliflower in the same row and between the rows; a row of spinach, green onions from sets, or spring radishes planted between early cabbage, cauliflower, or parsnips; a thin sowing of spring radishes made with the parsnip seed. Many other combinations of companion crops may be made. Care must be exercised in selecting such crops and in harvesting the early maturing one before it damages the main crop. In large farm gardens, the gardener is not justified in practicing much companion cropping, because of the difficulty in controlling weeds and conserving moisture.

By the proper use of succession cropping in the garden plan, idle ground may be avoided. In succession cropping, one crop is harvested and the ground again prepared and planted to a second crop. In planning a succession crop, one needs to know the approximate time of harvest for the first crop and the proper planting dates for the second. Most succession cropping combinations have an early maturing spring crop, such as spring radishes, green onions from sets, spinach, lettuce, or early peas for the first crop, with late potatoes, beans, eggplants, late beets, or late turnips for the second crop.

For the succession crops or those for summer, greatest care must be taken in planting suitable varieties. For instance head lettuce, only Los Angeles, New York, or Wonderful will stand the drought and heat sufficiently to mature solid heads under corn belt conditions. To extend the season of peas, the use of tall growing varieties for late May planting is fatal, but by planting such dwarf varieties as Thos. Laxton, Little Marvel, or Blue Bantam, a profitable crop will be secured for late July and early August. Long White Vienna or White Shasburg is a good bet for a summer radish. Edmand's Early Columbia and Black Red Ball varieties of beets are recommended for summer plantings, and "All Seasons" cabbage is best for summer, while Greater Baltimore is the main crop of tomatoes for fresh fruits and canning. Attention to suitable varieties will help both the country and town gardener in getting both quantity and quality.

When to Use Mulch Paper

The greatest value of mulch paper in the home garden probably lies in its ability to practically eliminate weeds and help in the conservation of the moisture supply. The greatest disadvantage of mulch paper is its relatively high cost. This is not so im-

(*Turn to page 57*)

Clippings from equal areas of unfertilized pasture (left), fertilized once (center), and fertilized twice (right). The yields demonstrate that generous fertilization of pastures pays.

Invest in Pastures

By C. A. Le Clair

St. Louis, Missouri

FARMERS know that corn, wheat, and cotton are not sold by the acre but by the bushel or pound. They realize that frequently the quality of their crops is in direct proportion to the yield, the bigger the yield the better the quality of the harvest. Yet, when it comes to the matter of growing pasture, which covers more acres than any other crop produced in America, too few appreciate that the same natural botanical law operates.

Hence, we hear remarks something like this: "I've got plenty of pasture and can rent more for a few dollars per acre when needed. Why invest in fertilizer for pasture?"

The man who talks like that fails to realize that it would require 30 acres of the kind of grazing he has in mind to maintain a single cow. She'd be forced to travel 25 miles a day to get enough food to fill her stomach. The energy required to find it would leave none for milk-pail production.

The fact is that the manner of growth of pasture is identical with the agronomic habits of other farm crops. Furthermore, there isn't another staple crop grown whose nutritive richness so markedly improves in proportion to the luxuriance of its growth. It is likewise the case that few, if any, farm crops respond more noticeably to soil treatment.

The Perfect Food

There are two reasons why the difference between just so much landscape and a productive meadow has for so long directly affected the stockmen's pocketbooks without the stockmen realizing it. The first is that the animals eat the evidence. The second is that ordinarily the poorer and most distant acres from the farm buildings have been relegated to grazing purposes and consequently have had least attention. With few exceptions, even on the best farms, pasture lands have been subjected to continuous cropping with no adequate return of the fertility removed by the animals. However, in the light of the latest discoveries of agronomists and animal nutrition investigators, the

economy of effecting a systematic pasture improvement program on every dairy and stock farm will soon be generally recognized.

No one has yet, nor perhaps ever will find a substitute for pasture as a means of economically making milk and meat. The mineral, fat, carbohydrate, protein, and vitamin content of good quality pasture is about in the same proportions as these essential nutrients exist in milk. Hence, it is not surprising that pasture has been found to be so efficient in the production of milk—the perfect food.

Researches indicate that whereas a dairy cow can produce as high a production as 30 pounds of milk a day and maintain her weight at the same time when given access to good pasture, it is impossible to get the same results with the same animal under a system of barn feeding. In fact, in the absence of pasture during winter feeding, high-producing animals are unable to maintain their milk flow except at the expense of the elements stored in their bodies, no matter how well they are fed. Only when the essential elements are supplied in pasture can sufficient of them be assimilated so as to permit a maximum yield of milk without depleting the reserve strength and body tissue of the animal.

Pasture provides more digestible nutrients per 100 pounds for herbivorous animals than is available from any other crop, alfalfa not excepted. Further, it costs less to feed stock the same amount of nourishment in the form of pasture than in any other way. This is because the animals harvest the crop themselves.

What Is Pasture Worth?

Fifty times as much grass in one clipping was harvested from the fertilized portion of a Kewanee county, Wisconsin, pasture six weeks after treatment. That is the equivalent to getting 49 acres of pasture for $16.00, the cost of the treatment. Yet this is not all. The feeding value of the treated crop was materially better. In fact pound for pound it was far more efficient in producing meat and milk. Furthermore, the sod of the fertilized portion of the pasture was improved to such a degree that residual benefits from the treatment will accrue in succeeding seasons with added profits from the treatment.

The remarkable results described above were obtained on a meadow that had been fertilized initially in 1929 with a complete fertilizer at the rate of 375 pounds to the acre. During the first year, analyses of clippings from the treated pasture revealed that 373 pounds more protein per acre were produced and that the phosphoric acid and lime content of the herbage were increased 90 and 395 per cent, respectively. In the spring of 1930, the same area was again dressed with a similar application of complete fertilizer. It was when comparing the production of the twice-treated area this spring with the yield of the same sod not so treated that it was found how the returns of pasture dressings pyramid.

The Cows Answer

In considering the effect of fertilizer on meadows, it should be remembered that the condition in which perennial grasses go into winter materially affects the productive life of a pasture. Under heavy grazing, top-dressing with commercial fertilizer enables the grass and clover to go into winter in a more healthy condition. Hence, repeated fertilizing of pastures produces increased returns over those obtained from a single dressing.

By maintaining small enclosed areas of pasture from which clippings can be weighed and measured, any farmer can determine the optimum frequency and most profitable rate of application for subsequent treatments.

Proof of the appreciation of animals for the better quality herbage produced by fertilizer is evidenced by the way they feed on the treated por-

tions of a meadow when given an option. Complete fertilizer produces many times more nutritious and palatable pasture than is produced by animal droppings. This is indicated by the fact that cows will pass up the latter even in preference to herbage where no droppings have been made, while on the other hand, they will seek out the heaviest fertilized areas of the field and browse these down as close to the roots as possible. This has been observed many times. Cows turned into a fertilized pasture will seek the spots in the field where the spreader hopper was filled and where plant food has been spilled in greatest quantities.

When it is considered that milk can be produced with cows on pasture at one-fourth the cost of barn feeding, pasture profits attain a new significance. Cows are the hardest workers on the farm and they respond generously if the same care is taken in the management of their pastures as is given the corn and grain fields. It is easily possible to quadruple pasture profits by proper fertilizer treatments. This has been done by the Massachusetts Agricultural Experiment Station and others.

Agricultural scientists of many nations have demonstrated that pastures markedly respond to proper plant food treatment. Chemical analysis of the well-fertilized herbage invariably reveals a much higher percentage of both vegetable nutrients and essential minerals than unfertilized herbage contains. However, what the animals themselves say about fertilized pastures naturally impresses farmers most. The writer has seen animals suffering from extreme mineral deficiency, by reason of being forced to subsist on inferior crops produced on depleted soil, completely recover, gain weight, and increase their milk flow when browsing on the same acres following a single application of as little as 500 pounds of commercial fertilizer.

There are vast areas in this country climatically adapted to livestock husbandry where the industry doesn't pay at present for the sole reason that there is insufficient available plant food in the soil to produce crops of a quality adequate for the needs of the stock. Farmers in these localities are purchasing feeds by the thousands of tons without any permanent improvement of the condition being effected.

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Worthy cows on spacious pastures, yet they are starving for lack of minerals the scant herbage fails to provide them.

Knowledge Is Power

Experiments on Ontario Farms Demonstrate

By Henry G. Bell, B. S. A.

Associate Professor of Chemistry in Charge of Fertility Extension

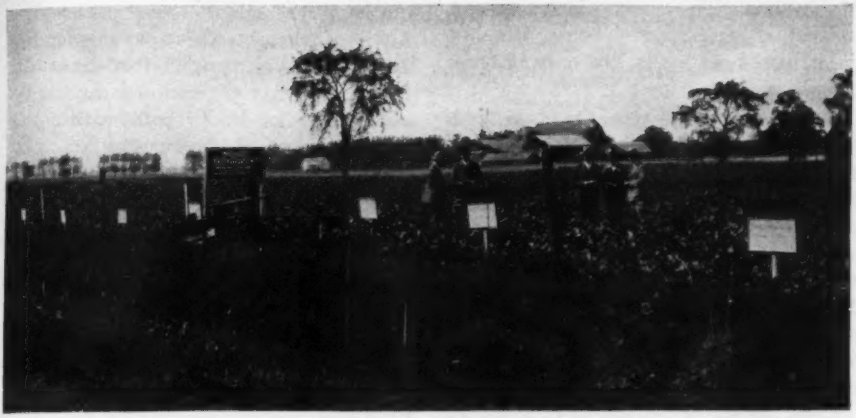
WITHIN the past two years the Department of Chemistry of Ontario Agricultural College, Guelph, has inaugurated cooperative fertilizer demonstrations throughout the province of Ontario. The main aim of this work is to demonstrate that properly chosen fertilizers used in sufficient amounts pay good return on the money invested. There is no claim that this is a discovery, for the place of fertilizers in farm economics has been clearly established in successful agriculture in Europe for almost a century, in Eastern United States for half that time, and on not a few farms of this province for at least two decades.

Fertilizers must be suited in formula to the type of crop upon which they are used. Moreover fertilizers must be suited in formula to make up for the characteristic weakness of the soils upon which they are to be used. With these basic principles in mind and the purpose of demonstration clearly before it, the Department of Chemistry inaugurated a series of plots in 1929 which it enlarged to the number of 325 in 1930. This means that demonstrations were established on 325 farms throughout Ontario from Windsor to Ottawa—from Lake Erie to Thunder Bay District. In all, 1,200 plots were laid down totaling over 300 acres of actual field demonstrations.

The crops included potatoes, sugar beets, turnips, wheat, oats, barley, corn, beans, peas, meadows, alfalfa, pastures, apples, grapes, peaches, and certain vegetable crops. The plots fertilized in each test ranged from 1/10 acre to 1/2 acre. Fieldmen of the Department laid out the demonstration plots, applied the fertilizers, and harvested the crops. This procedure insured a high degree of accuracy.

Typical of the field meetings was this one held for potato study at Alliston, Ontario, July 24, 1930.

One of the interesting developments in connection with the system of demonstrations was the popularity of evening field meetings and day meetings, in centers where in their own communities farmers could visit and study two or more demonstrations.



Fertilizer tests on sugar beets were conducted on the farm of Harry Wilson, Chatham, Ontario, during 1930.

Assemblies, varying from a couple dozen farmers to over 150 and keeping the field specialists busy many a night till darkness, concluded what the farmers termed highly helpful meetings.

Many interesting results are recorded. They will be discussed under the following crop headings:

Potatoes

In all, 32 demonstrations were carried out in Southern Ontario, involving 135 plots. Some of the outstanding returns are as follows:

A HIGH RATE OF POTASH PAYS BEST ON LATE POTATOES

Fertilizer Used	Rate Per A.	No. of Tests	Average Yield in Bus. per A.	Largest Yield per A.
Check		28	178	
4-8-4	500 lbs.	1	179	179
4-8-6	" "	9	201	248
4-8-10	" "	37	250	398

These results show a progressive increase from the use of additional potash. The findings of 1930 corroborate those of 1929, viz., that on late potatoes, high-potash fertilizers pay best. Since the potato stores large amounts of starch, and since potash in liberal amounts is essential in the building up of starch, these results are quite in line with expectation.

Relative to most profitable quantity of fertilizer to use per acre, results obtained are listed in the following table. Under present field conditions these data would indicate that peak increases in yield from fertilizers is reached between 1,000 and 1,500 lbs. per acre.

MOST PROFITABLE AMOUNT PER ACRE

Fertilizer Used	Rate per A.	Yield per A.
2-12-6	500	218
	1,000	226
	1,500	203
4-8-10	500	251.6
	1,000	299
	1,500	266

These figures are confirmed by previous findings of this department. In this work Dr. R. Harcourt, Professor of Chemistry, Ontario Agricultural College, reported as follows:

2-12-6 FERTILIZERS ON POTATOES

Lbs. Fertilizer per Acre	Cost of Fertilizer	Aver. Yield per A. Bus.	Gain in Bus. per. A.
....	....	151	....
200 lbs.	$ 4.37	216	65
400 "	8.74	248	97
600 "	13.11	263	112
800 "	17.48	282	131
1,000 "	21.85	295	144

Sugar Beets

During the past summer nine comprehensive demonstration-experiments were conducted in the sugar beet area

of Ontario. Thirty-six plots received individual treatment. Some notable gains have been made, not only in tonnage but in per cent sugar.

In six experiments 0-12-15 at 250 lbs. per acre gave an average yield per acre of 14.7 tons carrying 15.8% sugar. When this same fertilizer was increased to 750 lbs. per acre, the yield was increased to 16.8 tons with a sugar content of 15.3%. When 0-12-15 applied at 250 lbs. per acre was supplemented with a side-dressing of 200 lbs. per acre, the yield was increased to 16.2 tons per acre and 14.7% sugar. When the same mixture was applied at the rate of 750 lbs. per acre the tonnage was 17.7 and the sugar content 16.1%.

The popular fertilizer among sugar beet growers in Ontario has been 2-12-6. In two tests where this fertilizer was applied at 250 lbs. per acre, the yield was 14.5 tons per acre and the sugar content was 16.7%. It was felt that this was not sufficiently high for potash, hence a test was laid down where 2-12-6 at 200 lbs. per acre was supplemented with 200 lbs. of sulphate of potash. This gave a yield of 18.1 tons per acre and 15.8% sugar.

It was felt by some that 16% phosphate was not well balanced, hence a fertilizer analyzing 2-16-6 was tested on two areas. In one case a similar area received 200 lbs. of 2-16-6 plus 200 lbs. sulphate of potash per acre. The 2-16-6 yielded 15.5 tons of beets carrying 15.4% sugar. The 2-12-6 plus sulphate of potash yielded 15.6 tons carrying 16.2% sugar.

The average yield of checks in all of these tests was 13.4 tons carrying 15.7% sugar.

All of these tests show a splendid return on investment in fertilizers. It is apparent that the ratio of the N, P, and K has an important bearing on results in sugar beets and on net profits. High potash along with high phosphate and a fair supply of nitrogen produce best results. It should be explained that growers in 1930 were paid a flat rate of $7.00 per ton at the factory for their beets, and a bonus of $1.00 per 2% above 14% sugar in the beets. Figuring results on this basis the net returns for increase over check are approximately as follows:

INCREASED POTASH DOUBLES PROFITS

Fertilizer	Rate	Invest-ment per A.	Average Tons per A.	Average % Sugar	Inc. over Check Tons	Inc. over Check % S.	Value of inc. per A. over Check	Net Profit from Fert.
Check			13.4	15.7				
2-12-6	225	$4.73	15	16	1.6	.3	$11.35	$6.62
2-12-6 +K_2SO_4	200 200	10.20	16.8	16	3.4	.3	23.95	13.75

Alfalfa

It was alfalfa that furnished the greatest surprise in 1930. Six experiments were conducted in an equal number of good alfalfa sections. When well established this crop was generally believed to be sufficient unto itself. Being a legume it had its own means of gathering nitrogen. Famed for its deep roots, it was generally supposed to be able to find sufficient mineral nutrients.

A demonstration experiment was planned on half-score plots, top-dressing certain plots with 2-12-6, and an equal number with 0-12-15. Here are the results: in 5 tests 2-12-6 alone at 400 lbs. per acre gave an average increase over no fertilizer of 1,266 lbs. In 6 tests where the nitrogen was dropped and the potash of the fertilizer was increased 2½ times, the net increase from fertilizing with 0-12-15 at 400 lbs. per acre was 6,737 lbs. of alfalfa. High-potash fertilizers gave a gain of 45.2 per cent in yield over

unfertilized areas; while the low-potash fertilizers gave a gain of only 26.4 per cent in yield. It is well known that alfalfa is a heavy user of potash, hence the logic of using phosphate-potash fertilizer on this crop.

Tomatoes

Five widely separated demonstration tests were conducted on tomatoes. The check plots averaged a yield of 54.9 bus. per acre; 0-14-6 yielded 137.9 bus. per acre; 2-12-6 yielded 151.3 bus. per acre; 3-10-5 yielded 180.3; and 4-8-10 yielded 193.1 bus. per acre, when all were applied at rates varying from 500 to 750 lbs. per acre. When 1,250 lbs. of 3-10-5 were applied the yield was 303 bus. per acre. Where 4-8-10 was applied at 1,250 lbs. per acre it yielded 243.5 bus. Necessarily variations in soil types accounted for variations in yields, however a close study of results obtained will show the necessity of a medium high-grade fertilizer with tomatoes, emphasizing potash on light soils, but not over-emphasizing nitrogen.

Tomatoes were fertilized with 3-10-5 on the farm of Smart Bros., Collingwood, Ontario. Note the unfertilized rows at the left.

Tobacco

During the past two years extensive tests of fertilizers of varying composition have been made with flue-tobacco in Norfolk county. Over 30 combinations of N, P, and K have been tested. Both sources and quantities of potash in tobacco growing are being tested. The 1930 crop has been cured and graded, and some interesting results are appearing. Naturally, the Department of Chemistry wishes to confirm its findings by more extensive tests before reporting on same.

Certain other demonstrations have raised problems requiring investigation. These will be studied individually. The hearty cooperation of all growers has had a large part in the success of this work, as has the keen interest of farmers in the vicinity of the demonstrations. The Agricultural Representatives in the counties where the tests were conducted have taken a personal interest in the work.

Taking the Information to the Farmer

It is one thing to obtain results and another to put them in understandable form and take them to the farmer. When Ontario Agricultural College opened its doors in 1874 it was for the purpose of training young men in the sciences and art which together lead to successful farming. The rich fund of information now on tap for student and farmer alike was not in existence in that day. The field was new. Outside of a few fundamental facts in pure science, the faculty of this new kind of institution had a rather sparse store of information to draw upon. But Ontario Agricultural College focussed its attention on the idea of obtaining information for the great industry—Agriculture.

Of recent years President George I. Christie has enlarged the vision. His clear-cut concept of taking information to the farmer on the farmer's own farm has taken the form of an extensive cooperative field-demonstration system. The Ontario Experimental Union, whose history is closely bound up with that of the early days of the College, distributes varieties of grains and other crops throughout the province for test. The Department of

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The Rots of Corn

By E. N. Bressman

Associate Professor of Farm Crops, Oregon Agricultural College

CORN is comparatively free of plant diseases. Entire losses of the crop are unusual. There are, however, several diseases which in the aggregate cause considerable trouble and in certain years heavy losses of the crop. Leading investigators estimated a loss in the United States of 125,000,000 bushels in 1919 from the root, ear, and stalk rots, a group of diseases known as the rots of corn.

The Illinois Experiment Station has stated that there is a 20 per cent loss in yields of corn in Illinois where diseased seed is used. This loss includes losses from smut and rust as well as the rots. Further, according to the statement, rot of corn not only reduces the yield of the crop but also reduces the stand, vigor of plants, quality, and ease of harvesting. General symptoms of the rots are blighting of the plant or seedling, firing, lodging, yellowing of the leaves, barrenness, and other factors which reduce yield and quality.

It is not uncommon to find moldy ears of corn. Until recent years these moldy ears were not looked upon as an important diseased condition of the crop. One worker says that dry rot of corn has been known since 1834. Most of the attention, however, has been from the standpoint of its effect upon livestock, rather than its effect upon the corn crop.

The first investigation of the many molds on corn was made in 1909 by Burrill and Barrett of the Illinois Experiment Station. In 1921 the Delaware Station reported that these rot diseases are as old as the corn crop. The fungi that cause them, however, only recently have been identified. Also, that it has been only since 1916 that the ear rot fungi have been associated with seedling wilt, root, and stalk diseases.

It has been shown recently that the losses from the rots are due not to the fungi alone, but to a combination of causes. These causes are parasitic organisms, unbalanced conditions of soil fertility, unfavorable environment, and inferior genetic constitution of the plant. All of these conditions, therefore, must be studied, and the problem is a complicated one. The large number of references to the rots in the last few years indicate that the diseases are being studied and progress is being made in not only determining the organisms, but also their control.

Organisms Causing the Rots

There is a large number of parasitic organisms which cause the various rots of corn. Among these diplodia zeae attacks all parts of the plant, but the most common point of attack is the node. The Iowa Station reported a serious outbreak in the fall of 1921 because of hot, wet weather. It is usually described as a dense, white mold and is often found on the butt end of the cob. This organism has been known for many years and has been reported in many states. It flourishes only when temperature and rainfall are high.

The Fusarium group of rots is a large one. Many of the species have been reported in the corn disease

studies. They are among the most harmful rot diseases. This group is common in Tennessee and Kansas, and is found in Missouri. The Kentucky Station finds that *F. moniliforme* appears to be more active then *Gibberella sp.* when they are associated on rotting corn-stalks. They believe that *F. moniliforme* will probably prove to be the most common cause of root and stalk rots of corn. The Nebraska Station as early as 1904 found this rot on corn in Nebraska and was of the opinion that it caused death in cattle.

The black bundle disease, *Cephalosporium acremonium*, has been described in detail. This disease blackens the bundles in the stalks and sometimes in the leaves. Many of the plants infected with this disease become purple or red, sucker, and are barren or produce nubbins. This disease is often overlooked in the germinator. The infected kernels have blanched, white tips.

Rhizopus spp. are common on corn in the germinator. This organism appears to be associated with Scutellum rot. Corn with scutellum rot is low in yielding ability and is subject to attacks by other organism. It is well to eliminate all seed which shows infection by this organism in the germinator.

Gibberella saubinetii, the organism which causes wheat scab, produces seedling blight in corn. There is an important relation, therefore, in the sequence of wheat and corn and this organism. Seedling blight of corn is caused only at low temperatures, and wheat scab is caused at higher temperatures, according to investigators. This organism is found on small grains and has been particularly common on barley in the Midwest.

The five organisms discussed above appear to be the most widespread and harmful, according to most of the reports. In 1920 two species of *Aspergillus* on corn were reported from Texas. One was called black mold and the other yellow mold of ear corn.

Corn-stalk testing is an increasingly popular method of determining whether the corn plants have been fertilized adequately with nitrogen and potash. The method consists of applying chemicals to cut plants in the field as shown in the picture. Fertilizer information is readily obtained. These tests have been made in all parts of the corn belt, and the importance of using more potash is being discovered in many new localities.

Varietal resistance was noted. These molds have been found on corn in other places.

Penicillium was found in 1927 in seed corn at Wisconsin. The writer found *Verticillium* in many ears of moldy corn in western Oregon.

Helminthosporium has been reported as causing seedling blight in corn at temperatures of 20° C. and high moisture content of the soil.

Pythium is a root rot of corn under cold, wet soil conditions, according to investigators. It rots the embryo, causes seedling blight and rots the roots.

A bacterial rot of corn has been reported by several workers. It is a serious disease in Arkansas.

In 1919 a stalk rot of corn due to a species of *Physoderma* was reported. It has been found in the Southeast quarter of the United States. In moist, hot weather it appears first as a rust on the leaves, then turns darker. The disease is known as brown spot of corn. There are other leaf sheath rottings.

Basisporium dry rot of corn was found to be prevalent in Iowa in 1923. It caused a damage of 50 to 60 per cent, according to the Iowa Station. Large amounts of moisture at time of maturity favors the disease. It is chiefly an ear rot, but may attack any part of the plant.

In 1928 the effect of *Sclerospora* (Downy mildew) on corn was reported. It acts as a seedling blight, and although it has been found only twice on pop corn in Iowa, it may become a common rot of corn.

Throughout the corn belt, the corn crop responds well to fertilization. In many areas the fertility of the soil has been greatly depleted of one or more of the important plant foods. When these conditions of unfavorable soil environment are due to either a lack of potash or phosphoric acid the corn plants suffer severely from root rots. Consequently, the correction of these plant food deficiencies results in large increases in yields in the areas where the root rots are credited in causing the greatest damages to this crop. Soil temperatures and time of planting are important because early planting of corn is greatly reduced in yield when seed infected with *Gibberella Saubinetii* and *Diplodia* are used. High moisture content in the soil was also unfavorable to corn infected with disease organisms. Fusarium-infected seed showed that the fungus grew more rapidly where there was a lack of aeration. Corn plants from good seed were not as severely affected by these adverse conditions as from poor seed.

Much work has been done to show the effect of iron accumulations in the joint tissues and aluminum salts in the soil on the various rots. It has been shown that lime is of little value in overcoming these troubles except as used with phosphoric acid and potash.

Crop rotation and crop sequence appear to be important environmental factors in affecting the various corn rot diseases.

Inheritance of the Plant

It has long been noted that certain plants are able to withstand attacks of the various rots. This ability to function normally under these conditions is without a doubt due to genetic factors contained by the plant. Various workers have illustrated the ability of different strains of corn to withstand attacks of smut. Some strains of corn are susceptible to *Gibberella saubinetii* while others are resistant. Some strains respond more than others to added plant foods.

In regard to their resistance to these rot organisms corn should be grouped as to whether it is open-pollinated or inbred. The Illinois Station points out that resistant strains are found in both and that in open-pollinated varieties resistance can be maintained by constant selection. In general, resistance to these diseases appears to be a dominant character. If so, the problem will be simplified in the new method of corn breeding which takes advantage of the F_1 hybrid vigor shown in

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The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

DOWN in southern Chile, Dillman Samuel Bullock, of Michigan, has cast his lot and found noble life-work to do.

Conscience, and not consideration of cash or selfish advantage, took him there. Since October, 1923, he has had charge of the "El Vergel" agricultural school, at Angol, for the Board of Foreign Missions of the Methodist Episcopal Church. That town is located but 70 miles north of the Araucarian Indian Mission, at Temuco, where, from 1902 until the summer of 1912, Mr. Bullock was missionary instructor in agriculture.

D. S. BULLOCK

In 1906, he met and married Miss Kathrine J. Kelly, Canadian by birth, and a missionary in the same school. She is equally conscientious and as devoted and satisfied with missionary work as is her husband. They have no children of their own, but enjoy working with young people and consider the life they are now living less selfish than it might otherwise be.

In 1912, Mr. Bullock resigned his position at the Araucarian Indian School, and became head of the County Agricultural School at Marinette, Wisconsin. There, he rendered eminent services as a teacher, and engaged energetically in county work. He organized and successfully acted as secretary of the Marinette County Order of the State Experiment Station Association. He also organized and conducted a system of buying and bringing into the county many high-class dairy cows and quantities of pure seed grains.

Beginning in July, 1916, he worked jointly for four years as extension representative for the University of Wisconsin, and the State Livestock Breeders' Association. During that time he organized and had charge of a pure-bred bull campaign from which later the National "Better Sires; Better Stock" was modelled.

In June, 1920, Mr. Bullock received

the Degree of Master of Science from the University of Wisconsin, the subject of his thesis being "A History of Holstein-Friesian Cattle in Wisconsin." This degree rounded out his academic honors, for in 1902 he had earned his B.S. from Michigan Agricultural College, with a thesis on "The Relation of Insects to the Pollination of Pears and Apples," and in June, 1911, was made a Master of Agriculture by his alma mater.

But South America called him again. He had learned to speak and write Spanish like a native. In July, 1920, he accepted a position as Commissioner with the U. S. Department of Agriculture, with headquarters at Buenos Aires. He arrived there in January, 1921, and studied the livestock of Argintina, Chile, and Peru until he returned to the United States in March, 1923.

Resigning his position with the Government in January, 1924, he became Director of "El Vergel" mission school at Angol, Chile. Since that time he also has been pastor of the local church, and in 1926 was made General Director of the Mission. Recently, he has been on furlough in the United States, but he expects to resume his work, in Chile, in March.

Mr. Bullock was born at Elba, Lapeer county, Michigan, November 25, 1878, on the farm taken up by his great grandfather in 1837. After preliminary training in the district school, he graduated from the high school at Hadley, and in January, 1898, attended the first short course in livestock given by the Michigan Agricultural College. Later, he took the regular course in agriculture.

An Inquiring Mind

From his earliest boyhood days Mr. Bullock has been a collector. In him the "inquiring mind and the seeing eye" are most strongly developed. His collecting propensity has borne good fruit. He has given Michigan State College a large collection of birds and mammals from Chile. In Chile he has a collection of bird skins representing nearly all the species found in the region around Angol, in addition to several thousand insects and many Indian curios. He also has made collections for the British Museum and the American Museum of Natural History, New York. For the past six years he has been sending insects to the National Museum at Washington.

Fifteen new specimens of insects and two new genera have been described from his collections, and he has many more new species which, as yet, have not been described. In addition to these accomplishments, he discovered in Chile one new species of fish and a new moss. The latter belongs to a genus never before found west of the Andes. Five new species have been dedicated to him by the scientists who described them.

When working in Wisconsin, Mr. Bullock made and presented to the University Museum what Mr. Frank Collins Baker, author of "The Fresh Water Mollusca of Wisconsin," pronounced "a most valuable collection of Wisconsin material which has provided many records for the State that would otherwise be missing." The collection added four species to the fauna of the State not found in any other collection, and one of them is new to science.

In 1924, Mr. Bullock published an illustrated pamphlet in Spanish on the birds of Angol, and another on those observed on a trip across the coast range west of Angol. Wherever he goes, he keeps his eyes and ears open for something new, and returns from nearly every trip with many interesting curios.

When this industrious naturalist left the Araucarian Mission in 1912, he feared his work had been somewhat unsuccessful from an agricultural standpoint. For almost 10 years he had tried to get the Indian boys to plant and care for fruit trees, but not one of them did so, although he supplied trees at half price and gave prizes

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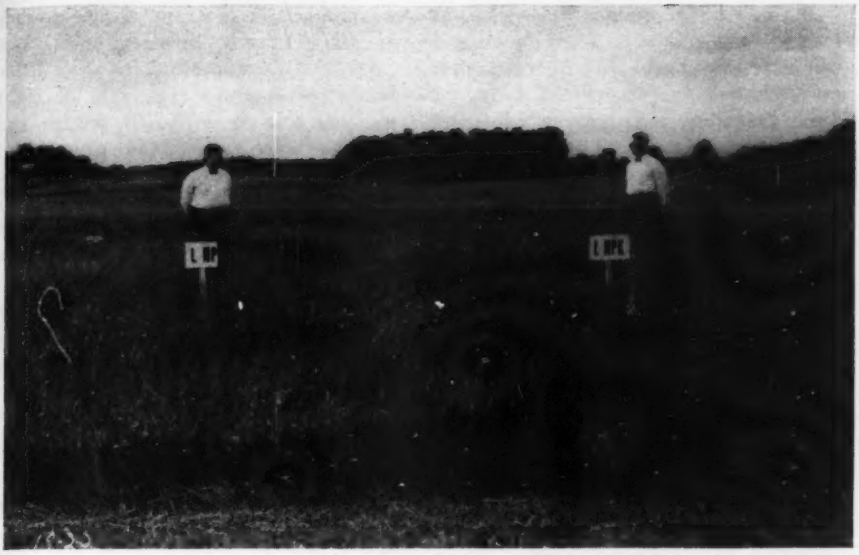

Clover Needs Potash

By A. G. Weidemann

Soils Department, Michigan State College

THIS is a story of experimental work on the farm of R. V. Tanner in Jackson county, Michigan, started in 1926. Jackson county is in southern Michigan and the soil on the Tanner farm, a yellowish gray, slightly rolling Hillsdale sandy loam, is representative of a large area, principally in this and adjacent counties. The data show that after such a soil is limed and the seed is inoculated, it yet requires potash to give the young clover the resistance to withstand the rigors of winter and the drought of summer.

But to go back a bit. Previous to starting the experiment, clover farmers often told of how they used to grow bountiful crops of clover but how utterly impossible it seemed to do so of late. Such stories are told even yet, but the secret to success has been exposed, at least in part.

Nearly every farmer seemed to realize the value of clover both as feed and as a soil builder. Apparently the change from clover to no clover was occasioned by the disappearance of something from the soil that was originally there. Generally this change had taken place on the lighter soil types although there are large areas of heavy soil on which it is quite impossible to grow sweet clover and alfalfa without replacing in the soil the things that have been removed by cropping and by natural forces.

With the introduction of the practices of liming the soil and inoculating the seed it had been generally supposed that the hazards associated with growing red clover had been reduced or eliminated, yet failures continued.

Before the experimental work was started, the soil was acid showing a pH of from 5.5 to 6. When it was first cultivated, it grew profuse crops of June (medium red) clover whenever the seed was sowed. Then for a considerable period of years the farm was badly run, not wilfully, but as a result of lack of knowledge in handling such soils.

The main point under examination was the reliability of a four-year rotation consisting of corn, oats, wheat, and June clover. By June clover is meant what is commonly called "medium red clover" in most parts of the country.

The Methods Used

In order to facilitate getting results on every crop in favorable as well as unfavorable years, the experimental area was divided into four strips thus making possible the growing of each crop of the rotation every year. There were 16 different plots in each series of treatments, and each series was duplicated on an equal area adjacent, making 32 plots devoted to the growing of each crop each year.

Thus the yields of corn, oats, wheat, and clover were secured each year under 16 different treatments. The clover seed sown each spring in wheat is invariably inoculated although very few farmers who sow June clover ever inoculate the seed.

There were three check plots in each series. The rest got a basic application of limestone screenings at the rate of two tons per acre at the beginning of the experiment. There were plots with lime only, and with several combinations of nitrogen, phosphorus, and potash, as well as barnyard manure, as shown in Table 1.

Where nitrogen was included, it was used at the rate of 100 pounds of nitrate of soda every year except on the clover; where phosphorus was used, it was applied at the rate of 200 pounds of 20 per cent superphosphate every two years; where potash was used, it was applied at the rate of 100 pounds of 50 per cent muriate every two years. Manure applications were made every two years at the rate of eight tons per acre. Phosphorus, potash, and manure were applied in preparation for wheat and corn. Sulphur was applied at the rate of 100 pounds per acre only once (at the beginning of the experiment). Where phosphorus, potash, and manure were used together, only 100 pounds of 20 per cent superphosphate and 50 pounds of muriate of potash were used with the manure.

The treatments along with the clover yields are given in the following table:

Table 1.—*Yield in pounds per acre of June clover hay on a Hillsdale sandy loam soil in Jackson County.*

Treatment	Yields, in pounds of dry hay per acre 1929	1930
None	674	....
L	438	....
L-NPK	3,915	1,987
L-NP	346	....
L-NK	3,696	1,490
None	428	....
L	417	....
L-N	808	....
L-K	4,037	1,145
L-P	317	....
L-P and Sulphur	864	....
None	518	....
L	720	....
L-PK	4,380	2,208
L-PK and manure	4,099	2,108
L and manure	4,664	2,039

L—lime; N—nitrogen; P—phosphoric acid; K—potash

The year 1929 was much more favorable for clover than 1930. This accounts for the fact that all of the plots made some hay in 1929. In general, those plots on which there was no potash in the treatment produced a

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Weedless Pastures

By O. C. Lee

Purdue University Agricultural Extension Division

REMEMBER way back when grasses in the pasture grew so luxuriantly that it was almost impossible to put enough livestock on to keep them from becoming too coarse for forage? This condition at present exists only in a few of the newer and less farmed areas. Again the "good old days" are gone forever. There should be no questioning of this statement, as our permanent pastures have gradually and surely declined in carrying capacity. Moss, daisies, cinquefoil, plantains, and other poor-land plants have replaced the clover and bluegrass. The problem of bringing back the good old pastures is one that can be solved only when that which has been taken out is put back.

Livestock is an asset to every farmer, and without pasture livestock cannot exist, at least not on a profitable basis. It then develops that pasture improvement and livestock go hand in hand. It has been estimated that milk can be produced on pasture at one-fourth the cost of milk produced on manger feeding. The average pasture period in general is five months. There is hardly any need for further evidence as to the magnitude of our grass land and pasture problem. The livestock population of the world represents more than a billion and a half animals, and is an economic resource only in so far as it can be efficiently fed and maintained.

Before describing the remedy for the faulty, weedy pastures, let us get at the cause of the trouble. Some farmers will argue that the weather is at fault, but the records of the Weather Bureau show practically no change in climate during the past century. The real reason for the condition is the lack of sufficient fertility to encourage grass growth and crowd out weeds. We must keep in mind that grass, like other crops, needs the essential plant food elements.

Let us see what has happened during these years of intensive pasturing.

A good pasture and good livestock go hand in hand.

Suppose you have a pasture of 60 acres in area, then try to estimate the amounts of minerals, principally phosphorus and potash, that have been removed by the livestock that has been sold from that pasture during the time of grazing. Add to this the minerals that have been taken out by the milk. Then add the lime that has been lost by leaching, and you will begin to realize the amount of materials that have been removed.

It is evident that the soil bank has been robbed, and that the land has gradually lost its fertility. Weeds have taken the place of grass, because weeds are nature's attempt to cover up sterile places. The process of elimination by the survival of the fittest gives weeds the advantage over crop plants. Very seldom is land so poor that it will not support weeds of some kind. You will see them growing on railroad beds, on cinder paths, and on the thinnest types of soils.

Fertilize for Weed Control

In the last analysis, to eradicate the weeds it is necessary to do away with the cause. This can be done by applying fertilizer as ammunition, and the most effective, based on recent experiments, is lime and a complete fertilizer, such as a 5-10-10. Again and again demonstrations and experiments as well as the experiences of many farmers point to these facts. Tests have shown that the addition of fertilizer and a few tons of ground limestone per acre on poor, weedy pastures has in many instances doubled and even tripled the land's carrying power.

On one of the Purdue experimental farms, located near Bedford, Indiana, the addition of two tons of ground limestone per acre gave an increase of 2,430 pounds of green weight pasturage per acre. Furthermore, the grass grew so luxuriantly that the weeds were practically crowded out.

Broom sedge is one of the most common of poor land weeds. The effect of fertilizer on this pest was demonstrated on a pasture in Perry county, Indiana. Superphosphate was applied in alternate strips and within two years the weeds were replaced with bluegrass where the fertilizer was applied. The unfertilized strips continued to leave room for the weeds, forming a marked contrast.

"Seeing is believing" and every farmer owning a weedy, run-down pasture should at least give fertilizers a trial. First the soil should be tested for acidity and if it needs lime, sufficient amounts to neutralize the soil should be added. Then about 500 pounds of 5-10-10 per acre should be

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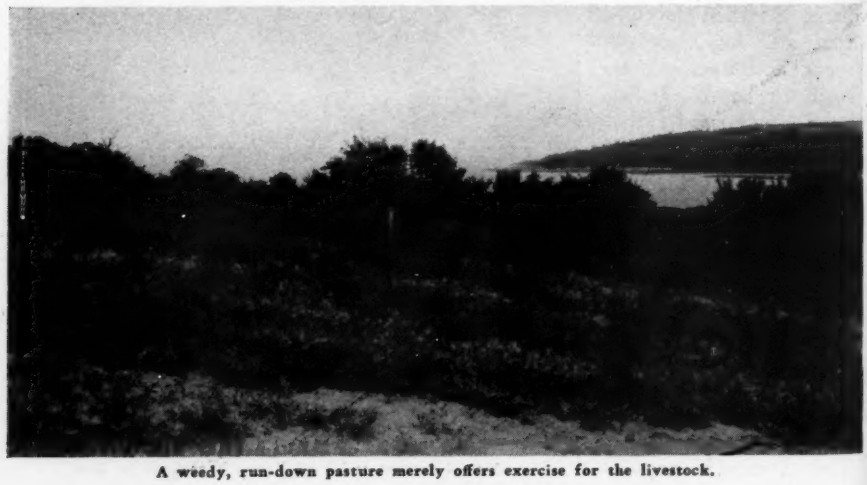

A weedy, run-down pasture merely offers exercise for the livestock.

George and Sam Egusa, ready to begin the demonstration which brought them first honors.

A First-prize Show

By M. E. McCollam

Puyallup, Washington

THE Boys and Girls 4H Club in Pierce county, Washington, created unusual interest with their demonstrational work during the past season. Drawing the greatest attention was a fertilizer demonstration conducted by George and Sam Egusa which not only won out in the county elimination contest, but competed and took first prize at the State Fair. This honor entitled the boys to compete at the Pacific International at Portland, Oregon, where their demonstration again took first honors.

The demonstration and the manner in which it was presented follows:

Geo.—Hello Sam, how are you?

Sam.—Hello George, I'm just fine. (Shake hands).

Geo.—I guess it's been about two years since I saw you, isn't it Sam?

Sam.—Yes, I guess it has been that long all right.

Geo.—Are you still raising potatoes?

Sam.—Yes, I'm still raising them.

Geo.—Well how did they turn out this year?

Sam.—They didn't turn out very good this year.

Geo.—What was the trouble?

Sam.—My soil was kind of sandy and I did not get enough moisture so they just dried up on me.

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Little Aroostook

By Ford S. Prince

Specialist in Soils and Crops, University of New Hampshire

IN northern New Hampshire not far from the Canadian line lies New England's little Aroostook, an area of narrow valleys and broad, sweeping hills the soils of which are ideally adapted for potato growing. The high altitude and climate of this section favor high potato yields and even the production of certified seed stock.

The Colebrook area, as this territory is known in New Hampshire, was formerly so specialized in potato growing that many starch factories were located nearby. With the changed conditions brought about by economic forces during the past 50 years in New England, dairying has come into major prominence in this region and the starch factories have gone out of business. However, potatoes have persisted as a side-line on nearly all farms, being the chief cash crop aside from dairy products.

Station Becomes Interested

The New Hampshire Experiment Station recognized the importance of the potato crop here and in an attempt to carry its work out closer to the farmers of the state located in 1927 a tract of land suitable for experimental work on the potato crop.

The field chosen is on the farm of John Jackson, a man vitally interested in potato growing and marketing and in the results of the experiment now in progress. He is the type of man who can be absolutely depended upon to carry out any field work necessary to be done when those actually responsible for the work are not there. We sometimes feel that he may neglect his own work to help us out on occasion, although he is growing about 50 acres of potatoes himself. As the experiment is located about 200 miles from the Station headquarters at Durham, it seemed necessary to choose a field on the farm of a man like this.

The field was heavily infested with quack or "witch" grass as it is generally called in New England. One of the reasons farmers in the Colebrook area give for not growing more potatoes is that quack grass is too abundant and vigorous. As that seemed to be an obstacle in the way of the potato operations of a good many men, we were glad to undertake the work in this field and have actually carried out a demonstration on the control of quack grass along with the fertilizer work on the potato crop.

Although the rotation generally practiced in this area is a long one, of from 5 to 10 years' duration, our thought was to follow a short rotation, one in which the potatoes would benefit from a clover sod. The field was therefore divided into three parts so that each crop could be grown every year. The rotation that we are following is potatoes followed by oats and alsike clover.

The Best Fertilizers?

Our job seemed to be to find out, not whether potatoes would respond to fertilizers—we already knew that they did—but rather what the best formula for potatoes might be. It appears to be quite important in producing a crop to which a ton of fertilizer is being applied to see that none of

(*Turned to page* 53)

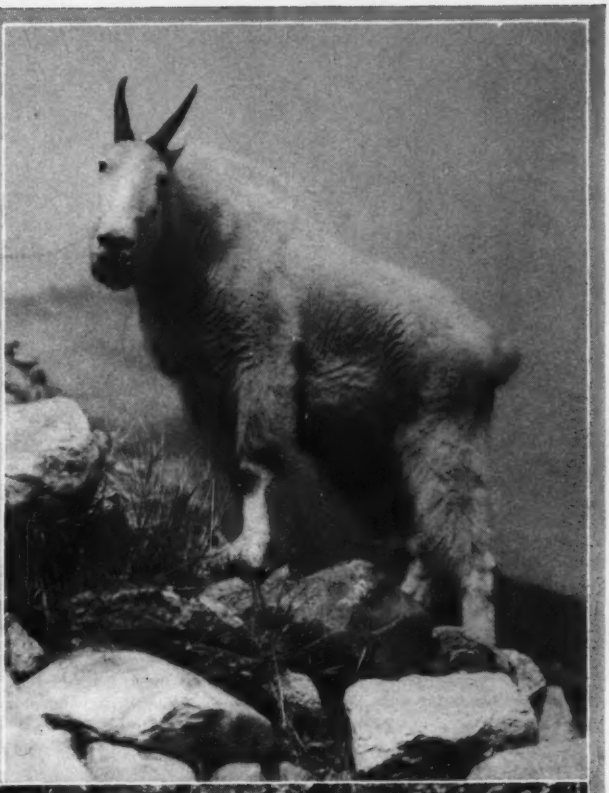
By Ewing Galloway, N. Y.

PICTORIAL

Left: Where it is "February" the year round — Mont Blanc, the highest peak in the Alps in Switzerland.

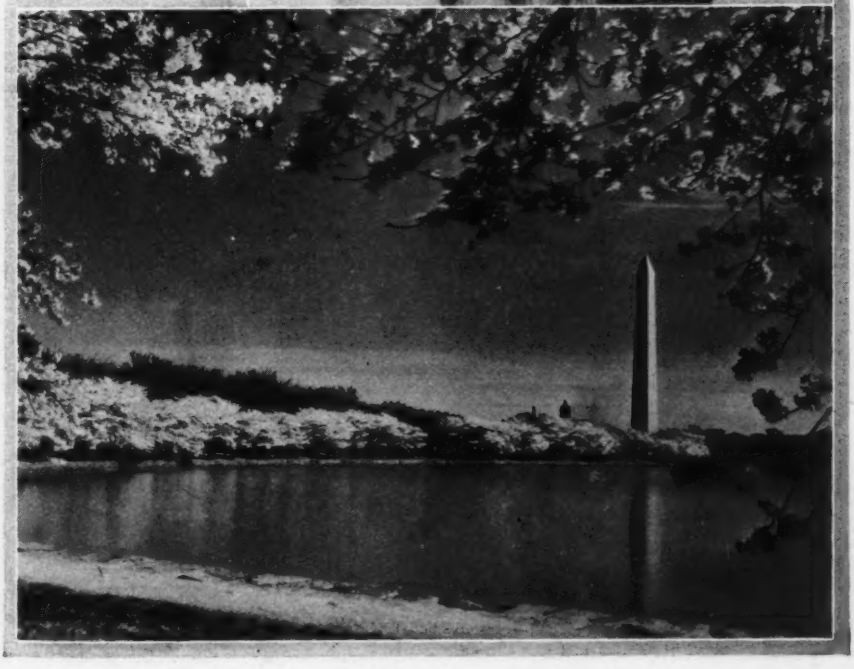
Below: Homeward bound after a busy day—a group of fishermen coming in after a day off the North Atlantic coast.

Right: A proud ruler of the high spots in America — the Rocky Mountain goat always wears a heavy "fur coat."

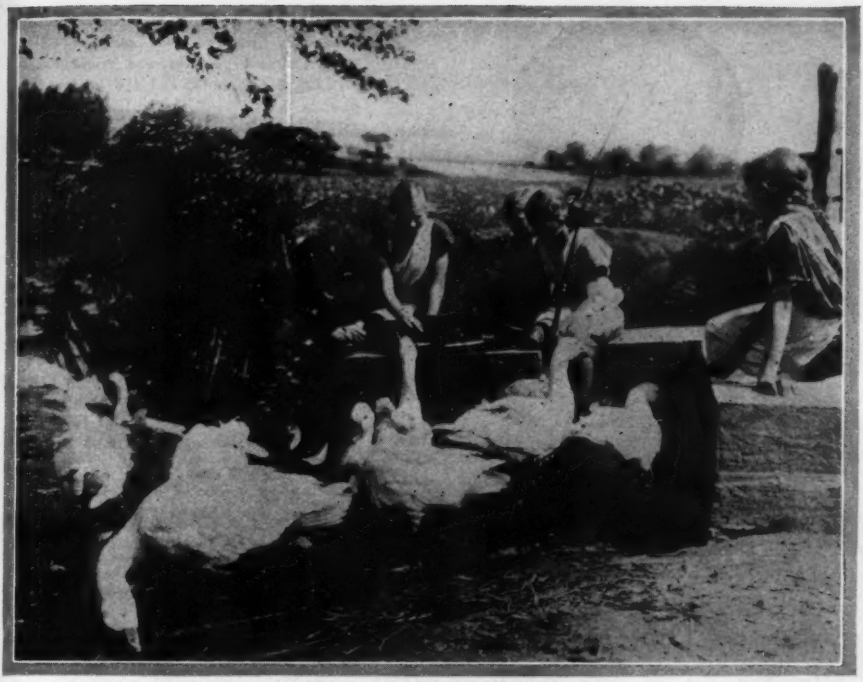


Below: Not a winter scene, but cherry blossom time in Washington, D. C.

© *Ewing Galloway*



Above: El Yunque, 3,483 feet, highest point of the Luquillo mountains of Porto Rico—until recently thought to be the highest elevation of the Island.
Below: A frequent sight on Porto Rico's mountain roads.



Above: These little "goose-girls" of the ancient village of Stroebeck, Germany, follow an old tradition by playing chess while they tend their flocks.

© *Ewing Galloway*

Below: A scene on a hops farm in Germany.

Erastus Parke of Burtt's Corner, New Brunswick, won first on certified Green Mountain seed potatoes, the grand championship for Canada, and the potash trophy at the Royal Agricultural Winter Fair held in Toronto. Mr. Parke's average crop of potatoes is about 9 acres, and this year he got a yield of 466 bushels per acre. He fertilizes with one ton per acre of 4-6-10 for his potatoes and takes a crop off the same ground every third or fourth year.

Mr. Parke has been growing potatoes for 20 years and was one of the first farmers in his district to use fertilizers and the first to try out a potato digger. He says that fertilizers have helped him greatly in building up the worn-out soils of his farm and in the production of high average yields.

(New Brunswick Government Bureau of Information photo.)

The Editors Talk

See More Demand for Farm Products

It is very gratifying to find a distinct note of optimism in the report of the Annual Outlook Conference just issued by the Bureau of Agricultural Economics, U. S. Department of Agriculture. This optimism rests in the prospect for a gradual recovery in the domestic demand for farm products the latter part of this year, and for lower production costs. Except in the case of wheat and pork products, some recovery in foreign demand also seems likely, according to the bureau.

The prospect of improvement is based on the belief that the world-wide economic depression will have run the worst of its course by the summer of 1931 as consumption of many industrial products is now outrunning production. Prospects also will be affected by the volume of agricultural production in 1931.

Although production credit may be curtailed, ample marketing credit is expected. Farm wages are the lowest in many seasons and building materials and fertilizer prices are lower than they were a year ago.

The report states that "wheat growers are faced with rather discouraging market prospects; that unless yields throughout the world should be materially below average, prices are likely to continue to be low. World production has been increasing faster than consumption for some years and burdensome stocks have been piling up so that the world carryover on July 1 next will again be abnormally large.

"Some increase is expected in the commercial consumption of corn in the United States, but foreign demand is not expected to be large unless the production of feed crops in Europe is less than average and the Argentine surplus is small. Prices in the 1931-32 season are expected to average somewhat lower than in the current season, but some improvement in cash corn prices is looked for before the 1931 crop is available. There will be a tendency to increase corn acreage in the Corn Belt to replace reduced stocks.

"There will be a decreased market demand for oats, and livestock producers in the spring wheat area are advised to cut sufficient oats for hay to insure ample forage for feeding requirements, in view of prospective small hay supplies next season. There is indication of less strength in the market demand for barley. Prospect of a slight reduction in hog production this year is regarded as a favorable factor in the long-time outlook for the hog industry.

"Cattle prices the first half of 1931 are expected to average considerably below those of the first half of 1930, but it is believed that prices of most classes and grades will improve during the second half of the year. The livestock industries will have the advantage of relatively cheap feed grain.

"The dairy industry has been expanded to the point where even with the expected improvement in the business situation the bureau believes that the former favorable relations of prices of dairy products to the prices of other

farm products will not be restored this year. Domestic prices of dairy products have declined nearly to the world level, and foreign markets do not afford an advantageous outlet for American dairy products."

With regard to vegetables the bureau says that "increased supplies of potatoes in prospect in the 1931 crop year will more than offset any improvement in demand; a large increase in sweet potato production is expected; cabbage growers in the late States will receive lower prices than in 1930 unless acreage is reduced; lettuce growers must guard against over-expansion in production; production of late onions should be reduced; and the maintenance of the 1930 acreage of tomatoes for canning and manufacture this season may result in excessive supplies."

The bureau says of fruits, "Market prospects justify the maintenance of the present numbers of apple trees in commercial orchards, and possibly some increase; although the trend of orange production is upward, the increase now in prospect does not appear excessive; grapefruit production is increasing in all regions and promises to lead to serious over-production unless consumption should be increased much more than is expected; in most peach-producing areas outside California the prospective changes in bearing acreage are moderate; commercial strawberry acreage for harvest in 1931 promises to be considerably smaller than in 1930. Grape growers face difficult marketing conditions for the next several years.

"The general market outlook for tobacco is less favorable than it was a year ago. The domestic demand for tobacco has weakened, and the foreign demand is only fair. Some decrease in acreage in 1931 from the indicated high total of 2,110,300 acres harvested in 1930, especially in the flue-cured and burley areas, would favorably affect the market outlook for these types.

"Rice acreage in the Southern States can probably be maintained at about the present area without depressing prices below the 1930-31 level. Flax has brought high relative returns as compared to wheat and other small grains the last few years, but these levels are not likely to continue during 1931."

The conference from which the above are only a few of the more than forty farm crops and classes of livestock on which a national outlook was given, was attended by more than fifty leading agricultural economists, extension workers, and commodity specialists from all parts of the United States. Practically every State in the Union was represented and these States are to issue State or regional outlook reports following this national conference, and hold meetings with farmers to give them the results of research upon which they may shape their 1931 production plans.

The prominent place of agricultural economics in present-day agricultural education is seen in the wide interest with which this conference was awaited and in the wide-spread dissemination of the outlook material. Forty States prepared State or regional outlook reports following the issuance of the National Outlook for 1930, and more than 4,000 outlook meetings were held. It is rightly expected that even more interest and attention will be given the careful studies and conclusion summarized at this year's conference.

Successful Diversification

Radical changes are taking place in Cuba's economic structure as the result of the collapse in price of the Island's major product—sugar—so reports Commercial Attaché Frederick Todd in a bulletin issued by the United States Department of Commerce.

This readjustment is of vital interest as showing an instance where a single cropping system of agriculture has of necessity been changed and is being changed. As the report points out, Cuba has been more or less dependent on the status of sugar. When sugar was selling at 23 cents a pound, everything was well, but at the present time the price of sugar is close to one cent. Thus, at the present time the people of Cuba are producing something which can neither be sold at a profit abroad nor exchanged at home for the things they need.

As a cure for this situation, according to the study made by Mr. Todd, Cubans have begun to produce many of the articles that they formerly imported. They are also raising a number of foodstuffs which they formerly obtained from abroad. The Cuban people thus believe that they are entering the first stages of a new economic era in which they will be no longer dependent on one or two products for their income. A surprisingly long list of products which are now being regularly produced in Cuba is given in the bulletin.

Thus, out of this study two points merge—first, Cuba is not necessarily permanently down because they have in the past depended more or less solely on sugar; and secondly, while American agriculture as a whole is highly diversified, there are still regions where dependence is placed very heavily on the price of a single crop. What Cuba is doing will undoubtedly be a great encouragement for her people to strive further in diversified production, and, too, it is an interesting and instructive example for other crop-producing areas.

Fertilizer for Prizes

A novel contest in which commercial fertilizers are to be the prizes is being introduced in Minnesota. According to George W. Kelley, Farm Editor of the Duluth *News-Tribune and Herald,* prizes consisting of commercial fertilizers are to be offered by the crops and soils sub-committee of the Duluth (Minnesota) Council of Agriculture.

The prizes, three to each county of the Arrowhead region of northeastern Minnesota, will be awarded for the best work in variety tests of farm crops under the direction of high school teachers of agriculture. Each premium will consist of commercial fertilizer sufficient to replace the nitrogen, potash, and phosphorus taken from an acre by the crop grown. High school students and farmers are to be eligible. The plan is to add to the data on varieties recommended by the experiment stations and to disseminate knowledge of soil fertility drains by different crops. Potatoes, rutabagas, clover seed, small grains, and grasses are the principal products of the area.

This contest will undoubtedly be watched with much interest as a means of extending information on the use of fertilizers for profitable crop production.

Farm Wages are Lowest Since 1922

Farmers depending upon hired help may be encouraged to find this spring that they can secure good help for less money than at any time since 1922. According to a survey recently made by the Bureau of Agricultural Economics, U. S. Department of Agriculture, a sharp increase in the supply of farm labor, together with a further decline in the demand for farm help has forced the index of the general level of farm wages for January 1, 1931, to the lowest level on record for that date during the period it has been

computed quarterly (1923-1931). The wage index, at 129 per cent of the pre-war level on January 1 this year, was 21 points down from October 1, 1930; 29 points lower than a year ago; and 8 points below January 1, 1923, according to the Bureau.

"Day wages of farm workers not provided with board averaged $1.87 for the country on a whole on January 1, while the division averages ranged from $2.99 per day for the North Atlantic States to $1.25 in the South Central division.

"Wages paid hired farm labor during 1930 averaged lower than in any year since 1922. The weighted average index of farm wages last year was 152 per cent of pre-war as compared to 170 in 1929, and 146 per cent of pre-war in 1922.

"The supply of farm labor, as reported by crop correspondents, averaged 113.8 per cent of normal on January 1, as compared to 109.6 a month earlier, 105.9 on October 1, 1930, and 96.7 per cent of normal a year ago. The increase in the supply is attributed to the long continued decline in industrial employment.

"Although a large number of workers formerly employed in manufacturing industries are now available for farm work, the bureau reports that the demand for farm labor is the smallest in many years as the result of the extremely low current prices of farm products. Demand was reported at 66.6 per cent of normal on January 1, as compared to 68.9 a month earlier, 75.2 on October 1, and 84.2 per cent a year ago."

This condition may be expected to last until there is a material recovery in general business activity. It should operate to the advantage of agriculture.

Good Will Advertising

The wisdom of the famous statesman and orator, Henry W. Grady, who in his New York speech in 1886 said, "We have learned that the $400,000,000 annually received from our cotton crop will make us rich when the supplies that make it are home-raised," has been resurrected to serve as a basis for an advertising program by the International Agricultural Corporation in southern farm papers.

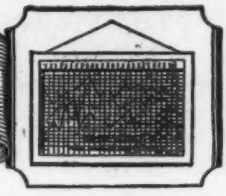
The "Live-at-home" program of Mr. Grady finds application today in the present emergency just as it did forty years ago. A one-crop system sooner or later inevitably meets its Waterloo, and the farmers of the South must make of cotton a "clean surplus" crop.

The advertising of the International Agricultural Corporation is not mere talk. Concrete facts and figures have been cited to prove that the "Live-at-home" program with more than one cash crop is economically safe and sound. We feel sure that progressive farmers, bankers, and business men throughout the South will greatly appreciate the admirable way in which the information is presented.

President John J. Watson and his company are to be thanked and congratulated for their perspicacity in helping to pull the farmers of the South from the "Slough of Despond" to firm economic ground.

Again, this advertising campaign is for good will only and it is calculated to help not only the farmers of the South but also all of those who conduct business in that section. We must, therefore, take off our hats to the International Agricultural Corporation for its generosity and magnanimity in the face of present conditions.

AGRICULTURAL DEVELOPMENTS



COLLECTS NICE SUM FROM HIS FATHER

Emil Jorgenson, county agent of Waushara county, Wisconsin, added $305 to his income last year. Failing to persuade his father, Fred T. Jorgenson of Waupaca county, that commercial fertilizer would prove profitable on his potatoes, Emil offered to buy the fertilizer if his father would give him the increase in selling value brought about by the fertilizer. The offer was accepted, and Emil paid $95 for 3-9-18 fertilizer for nine acres. He got $400 for the extra potatoes. Dad will buy his own fertilizers hereafter.—*George W. Kelley, Duluth, Minnesota.*

HOME-GROWN FOODS CUT HEALTH - PROTECTION COST

"A good cow or milk goat is one of the best investments a family can make to insure a satisfactory food supply," says the subcommittee on nutrition information, directed by the National Drought Relief Committee. "Milk contains the greatest assortment of nutrients of any single food material, and is the foundation upon which an adequate diet can most safely and easily be built. It is particularly important for its proteins of good quality, for calcium, for vitamin A, and for the pellagra-preventing factor."

"Every member of the family should have potatoes," according to these nutrition specialists, "tomatoes, raw cabbage, or other vegetables of green or yellow color." The home garden can be depended upon for all these foods. Some of them can be stored throughout the winter, others canned.

The poultry flock is always mentioned in the "live-at-home" programs of home demonstration agents in the cooperative extension service of the United States Department of Agriculture and the land-grant colleges. As a source of eggs and meat in the diet poultry contributes to the food supply. In some parts of the South, the drouth has played havoc with crops and has greatly depleted livestock, so that there is a shortage of home-grown products and also of ready cash. The committee on nutrition information nevertheless emphasizes the importance of continuing to try to maintain gardens, poultry, and one or more cows, wherever it is possible. Otherwise there is danger that many families will try to get along on too one-sided a diet, with pellagra and other physical disorders as a result.

If vegetables and fruit can not be grown, some of the food money should be spent for them. Canned milk and milk powder may be used in localities where it is difficult to secure good fresh milk, and where ice is not obtainable. Skim-milk has value. If it is the only kind of milk used, it should be supplemented, if possible, by 1 or 2 ounces of cod-liver oil per person per week.

NEW GLUE FROM SOYBEAN OIL

Ottawa, Canada — Experiments, which have been conducted for some time by the Forest Products' Laboratory, of the Canadian Government Department of Interior, give promise of a new glue being developed from a by-product of soybean oil. This new glue is likely to prove very valuable as an adhesive, particularly in the manufacture of ply-woods.

THE VIKING RASPBERRY

The Viking is an excellent new red raspberry, which is the result of a cross between the Cuthbert and Marlboro varieties. The former was used as the female parent and the latter as the male. This cross was made at the Horticultural Experiment Station at Vineland Station, Ontario, Canada. Its popularity has increased by leaps and bounds the last few years.

Because of its hybrid origin Viking has extreme vigor. The canes grow straight and strong and to a height of seven or eight feet. The canes are nearly thornless and hold up their heavy load of fruit without protruding in the row or tangling with the foliage of the new canes. These characteristics make the new variety preferred by pickers.

The large, bright fruit of this variety make it the leading one in markets.

Professor F. S. Reeves of Southport, Canada, who has grown Viking for several years, says, "For the Viking's good appearance the consumers prefer it, for its mannerly habits the pickers prefer it, and for its general all around good qualities the growers prefer it."

Viking is rather resistant to disease and it appears to take mosaic only in a mild form. This variety has been tested in New York and other States. George L. Slate, raspberry specialist in New York, says, "I think if I were setting out a plantation myself, I should prefer Viking to any other variety."—*E. N. Bressman, Corvallis, Oregon.*

CORN BELT MOVING NORTH

Regina, Saskatchewan.—The "Corn Belt" of North America has, in the last few years, slowly pushed its way north and today many parts of the prairie provinces of Canada are producing corn of different varieties and of high quality.

At the fifth corn show under the auspices of the Saskatchewan Corn Growers' Association, one of the finest exhibits of corn in the history of Western Canada was on display. The show was held in preparation for the World's Grain Exhibition and Conference to be held at Regina, in 1932, and many entries in the corn classes of the 1932 world-wide event may be expected from the farmers of Western Canada. A total of $19,000 is being offered in cash prizes in the different classes for corn.

AGRICULTURE INVESTS

The Federal Government and State agricultural experiment stations spend close to $30,000,000 a year to learn how to control production, reduce loss, and increase the profits of the $60,000,000,000 agricultural industry. This is only three-tenths of 1 per cent of the annual turnover of $10,000,000,000, a somewhat smaller proportion than the $200,000,000 which other industries invest in research.

This investment in research, according to Dr. A. F. Woods, director of scientific work of the United States Department of Agriculture, has made American agriculture, with all its shortcomings, the best in the world. Not only has it placed the business of agriculture on a sounder basis than it otherwise would be, but it has also brought about a conservation of the Nation's wealth of forest and animal life. Other industries have found their research expenditures a good investment in progress, Doctor Woods says.

POTATOES ARE GROWN IN EVERY PROVINCE

The total yield of potatoes in Canada in 1930 totalled 81,933,333 bushels, from 574,500 acres, an average yield of about 142 bushels per acre. In 1929 the yield was 66,550,000 bushels from 543,727 acres, an average yield of about 122 bushels per acre. Potatoes are grown successfully in commercial quantities in every province of the Dominion.

The Inquiring Mind

(*From page* 24)

to get them interested. One can, therefore, imagine the joy he felt when on returning 10 years later, he found a flourishing orchard at the home of nearly every one of his former pupils. They had not forgotten the instructions and demonstrations given by their teacher, but had waited until they had homes of their own and a free hand to put them into effect. In the agricultural school of El Vergel there are, today, many Indian boys who are sons, brothers, cousins, and nephews of Mr. Bullock's former students. They remember and appreciate the work done in the past, and now send relatives to the school.

The church at El Vergel, Angol, Chile, as seen from the park and flower gardens.

El Vergel, formerly called Bunster Farm School, has two farms. The part west of the Malleco River comprises 917 acres of river bottom land, the greater part of which is irrigated and used for nursery, orchard, flower garden, vegetable garden, dairy, and school purposes. The other part of the farm, lying east of the river, consists of 2,890 acres of very hilly and, in some places, rocky land, not suitable for irrigation. The soil, however, is excellent for wheat and oat growing and, during most of the year, for grazing purposes. The Institution is not only a Missionary School, but is a successful commercial enterprise; not for money making, but to support and maintain both teachers and pupils. The valley in which Angol is situated is singularly suitable for school and farm purposes.

The climate is extremely mild, so that apples, peaches, plums, quinces, and cherries abound. Apricots, persimmons, and English walnuts also flourish. Surprising as it may seem, such semi-tropical fruits as oranges, figs, lemons, grapefruit, olives, and even alligator pears also thrive in the valley, where snow rarely falls. The principal farm crops are, wheat, oats, barley, corn, beans, lentils, and potatoes. The mild winter makes it possible to have several kinds of fresh vegetables at all times during the year.

El Vergel has the largest nursery south of Santiago and the second largest in Chile. In it are some 2,600 bearing trees, mostly apples, besides a large number of young trees which will soon come into bearing. In all,

the nursery has over 650 varieties of fruits on trial, and contains nearly 900,000 plants of all kinds. Elbert E. Reed, a graduate of Iowa, has been in charge of the orchards and nursery since 1920, that work being his specialty, and wonderfully well executed. He is also responsible for the office, as well as the business relations of the Institution.

Dairying with finely bred cows is fast becoming an important department of the farm. From 40 to 60 cows are milked. Horses now number 71 head; cattle, 272 (including 119 work oxen); sheep, 673; and pigs, about 150. The sheep are grade Hampshires and the pigs grade Duroc-Jerseys. The sires are purebred.

The farm harvest for 1929 gave a total of 4,658 bushels of wheat, 1,626 of barley, 3,115 of oats, 1,532 of potatoes, 888 of lentils, and 331 bushels of beans. Wheat, barley, and lentils are principally cash crops. Some of the wheat is used to feed the workmen, and the oats, corn, potatoes, and beans, not used for local consumption, go to market.

El Vergel Rates High

The school has been in operation for eight years and four classes have been graduated. The course of study consists of three years of school work, together with actual practice in the field, and one year of practice in the particular section elected by the student. The signal success of some of the graduates has given the school standing and position among the educational institutions. The total average attendance of the school and its primary school is 65 daily. Both schools are under the direction of Mr. Bullock and receive a government grant sufficient to cover about half of the annual cost, the remainder being borne by the farm.

The strictly church work, with Mr. Bullock as pastor, is intended primarily to minister to the spiritual needs of the workmen and their families. Religious instruction is also a regular part of the school curriculum. By the different means employed, it is hoped the students will be so grounded in the principles of Christian living that they will lead useful Christian lives. The beneficient influence of the spiritual and moral ministration of Mr. Bullock is well evidenced by the fact that, in one day, he married some 22 native couples who previously had been living under common law conditions.

Another highly important feature of the work at El Vergel is the summer conferences and encampment for Christian workers of all denominations who speak English and for young people of all the Protestant churches of Chile. There are also two or more annual encampments of the Y. M. C. A. and Y. W. C. A. of Santiago and Valparaiso.

A Life of Service

These varied activities comprise a unique and wonderful undertaking for friend Bullock and his associates. In a way, the work means isolation and martyrdom. To the writer, it appears a fine expression of self-sacrifice, unselfishness, fortitude, and Christian purpose in this modest, unassuming, enterprising scientist. Although eminently qualified to head some great agricultural institution of research and education in his native land, he has elected, with his wife, to devote his life to the intellectual, practical, and spiritual training of the uncultured natives of a far country. Probably there will be meager financial gain and applause in his chosen work; but at least he will have the satisfaction of knowing that he is obeying the dictates of his conscience and usefully serving The Master. He hopes that the small corner of the world in which he and Mrs. Bullock are working will be a bit better for their influence and that the people there in consequence will have higher ideals.

We who remain at home can but extend them Godspeed and wish them success in their "Great Adventure."

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

The annual "Report of The Chief of The Bureau of Chemistry and Soils" of the United States Department of Agriculture, by H. G. Knight is an interesting and illuminating digest of the work accomplished and in progress in 1930.

"The Bureau of Chemistry and Soils is primarily a research and fact-finding organization whose activities cover a wide range of subject matter pertaining to land utilization, soil fertility, fertilizer resource development, and the utilization of agricultural products of various kinds. The bureau has for its objective the gathering of information and the determination of scientific facts and principles through experimentation and research to the end that these may be applied to the conservation and utilization of American soils and to crop-production and crop-utilization problems of regional and national importance."

The report gives a brief account of the progress of the work to date, together with a few statements as to information that has so far been obtained. It is the latter which makes the report especially interesting.

The fertilizer requirements of the cranberry are naturally somewhat peculiar, owing to the unusual conditions under which it grows, and data on the use of fertilizers for this crop are rather limited. Thus, the work of C. S. Beckwith of the "Effect of Fertilizers on Cranberry Land" (New Jersey Agricultural Experiment Station, Bulletin 501, June, 1930), should be of great interest to cranberry growers. The data over a period of years indicate that a complete fertilizer with an approximate ratio of 1-4-2 at 500 to 750 pounds per acre a year should be used. The nitrogen should be partly of inorganic and partly of organic origin, a readily available phosphorus carrier should be used and sulphate of potash is recommended as a source of potash. The fertilizer is shown not only to have increased the yield, but also the quality of the berries. The fertilized cranberries were larger and had less rot than the unfertilized.

"Commercial Fertilizers, Report for 1930," Agr. Exp. Sta., New Haven, Conn., Bul. 321, Oct., 1930, E. M. Bailey.

"Report of Analyses of Commercial Fertilizers," La. Dept. of Agr. & Immigration, Baton Rouge, La., Fert. Rept., 1929-1930, Harry D. Wilson.

"Sources of Nitrogen for Potato Fertilizers in Aroostook County," Agr. Exp. Sta., Orono, Me., Bul. 354, Apr., 1930, B. E. Brown, F. V. Owen, and E. R. Tobey.

"Fertilizer Recommendations for 1931," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 53 (Rev.), Nov., 1930, C. E. Millar, G. M. Gratham, and P. M. Harmer.

"Tabulated Analyses of Commercial Fertilizers," Dept. of Agr., Nashville, Tenn., Oct. 1, 1930, W. J. Fitts and H. P. Strack.

"Fertilizers for Pecan Soils," U. S. D. A., Wash., D. C., Leaflet No. 71, Nov., 1930, J. J. Skinner.

Soils

An excellent guide to the various soils of Connecticut and their fertilizer needs has been prepared by M. F. Morgan in "The Soils of Connecticut,"

(Connecticut Agricultural Experiment Station, New Haven, Bulletin 320, September, 1930).

The first part of the bulletin describes the various soil types, and gives a key to their identification. In this connection a well-prepared map showing the location of the soils is appended. The second part of the bulletin briefly considers the uses to which the different soils have been put; while the third part deals with their chemical composition. Under this latter subject, it is pointed out that the total phosphorus in the soils of this state is moderate, but the availability is low. The potash content is also moderately high, especially in the heavier soils. However, the author points out that "in spite of the high amounts of total potassium, the soils of this state that have not been liberally fertilized or manured are commonly so deficient in available potassium that most crops grown upon them are apt to suffer from a deficiency in this element." Most of the soils of this state naturally tend to be acid, but the actual acidity in any particular location will be largely dependent upon the treatment the soil has had. The fourth and last part of the bulletin treats in some detail the fertilizer needs of the various groups of Connecticut soils. The crops naturally have different requirements, but it is shown that in general most of them studied need phosphorus and potassium fertilizers on most soils.

Bulletins of this type are of great aid and value to County Agents within the state and in surrounding states with similar soils, and Connecticut is fortunate in having such a well-prepared publication.

"Soil Survey of The Bear Lake Valley Area, Idaho," U. S. D. A., Wash., D. C., No. 15, Series 1926, E. N. Poulson and N. C. Derrick.

"Soil Survey of Jackson County, Michigan," U. S. D. A., Wash., D. C., No. 17, Series 1926, J. O. Veatch, F. W. Trull, and J. A. Porter.

"Soil Survey of Menominee County, Michigan," U. S. D. A., Wash., D. C., No. 31, Series 1925, J. W. Moon, M. W. Beck, L. R. Schoenmann, and J. O. Veatch.

"Soil Survey of Polk County, Missouri," U. S. D. A., Wash., D. C., No. 18, Series 1926, H. H. Kruseckopf, Howard V. Jordan, and M. W. Beck.

"Soil Survey of Lenoir County, N. C.," U. S. D. A., Wash., D. C., No. 2, Series 1927, R. C. Jurney and W. A. Davis.

"Soil Survey of The Grande Ronde Valley Area, Oregon," U. S. D. A., Wash., D. C., No. 16, Series 1926, A. E. Kocher and W. L. Powers.

"The Physical and Chemical Characteristics of Certain American Peat Profiles," U. S. D. A., Wash., D. C., Tech. Bul. 214, Nov., 1930, Irvin C. Feustel and Horace G. Byers.

Crops

"Monthly Bulletin of the Department of Agriculture, State of California," Dept. of Agr., Sacramento, Calif., Vol. XIX, No. 11, Nov., 1930.

"St. Johnswort on Range Lands of California," Agr. Exp. Sta., Berkeley, Calif., Bul. 503, Dec., 1930, Arthur W. Sampson and Kenneth W. Parker.

"Annual Report of the Maine Extension Service for the Year Ending June 30, 1929," Univ. of Me., Orono, Me., Bul. 191, Apr., 1930.

"A Chemical Study of Cranberries," Agr. Exp. Sta., Amherst, Mass., Bul. 265, Oct., 1930, F. W. Morse.

"Hardy Woody Plants," Agr. Exp. Sta., Amherst, Mass., Bul. 267, Oct., 1930, Frank A. Waugh and Charles H. Thompson.

"Alfalfa Trials at the North Central Experiment Station," Agr. Exp. Sta., Univ. Farm, St. Paul, Minn., Bul. 267, June, 1930, Otto I. Bergh.

"Identification of Cultivated Raspberries," Agr. Exp. Sta., Univ. Farm, St. Paul, Minn., Tech. Bul. 66, Apr., 1930, J. D. Winter.

"Annual Report of Extension Work for 1929 in Agriculture and Home Economics in Mississippi," Miss. A. & M. College, A. & M. College, Miss., Ext. Bul. 54, July, 1930, R. S. Wilson.

"The Production and Storage of Sweet Potatoes," Agr. Exp. Sta., A. & M. College, Miss., Bul. 279, Aug., 1930, J. C. C. Price.

"Cotton Inheritance Studies, Lint Percentage," Agr. Exp. Sta., A. & M. College, Miss., Tech Bul. 18, Sept., 1930, J. Fred O'Kelly and W. W. Hull.

"Production and Feeding of Silage," Agr. Exp. Sta., Columbia, Mo., Bul. 287, July, 1930, L. J. Stadler, M. M. Jones, C. W. Turner, and P. M. Bernard.

"Dry-Land Shelter-belt Tests at the Judith Basin Branch Station," Agr. Exp. Sta., Bozeman, Mont., Bul. 233, Oct., 1930, I. J. Jensen and F. M. Harrington.

"Wheat Varieties Under Irrigation," Agr. Exp. Sta., Bozeman, Mont., Bul. 234, Oct., 1930, LeRoy Powers.

"Dry-land Shelter-belt Tests at the Northern Montana Branch Station," Agr. Exp. Sta., Bozeman, Mont., Bul. 235, Oct., 1930, F. M. Harrington and Geo. W. Morgan.

"Growing Potatoes in the Home Garden," Univ. of N. H., Durham, N. H., Ext. Cir. 110, July, 1930, O. Butler.

"Development and Ripening of Peaches as Correlated with Physical Characteristics, Chemical Composition, and Histological Structure of the Fruit Flesh: II. Histology and Microchemistry," Agr. Exp. Sta., New Brunswick, N. J., Bul. 507, Sept., 1930, R. M. Addoms, C. T. Nightingale, and M. A. Blake.

"Climate as It Affects Crops and Ranges in New Mexico," Agr. Exp. Sta., State Col., N. M., Bul. 182, Mar., 1930, Charles E. Linney, Fabian Garcia, and E. C. Hollinger.

"Film Strips of the U. S. Department of Agriculture," U. S. D. A., Washington, D. C., Misc. Pub. 91, Oct., 1930.

"Everbearing Strawberries," U. S. D. A., Washington, D. C., Farmers' Bul. 901, Oct., 1930, George M. Darrow.

"Supervised or Directed Practice in Evening Agricultural Schools," Federal Board for Voc. Education, Washington, D. C., Monograph No. 9, Oct., 1930.

"List of Technical Workers in the Department of Agriculture and Outline of Department Functions, 1930," U. S. D. A., Washington, D. C., Misc. Pub. 93, July 1, 1930.

"Second-growth White Pine in Wisconsin, Its Growth, Yield, and Commercial Possibilities," Agr. Exp. Sta., Madison, Wis., Res. Bul. 98, June, 1930, S. R. Gevorkiantz and Raphael Zon.

Economics

The prices received by farmers for their products appear to be the most reliable guides to probable future changes in farm production. In view of this fact, such studies as that presented by Roger F. Hale in Bulletin 321 of the University of Maryland, Agricultural Experiment Station are highly valuable. Entitled "Prices Paid for Maryland Farm Products, 1851-1927," this bulletin contains monthly prices received by Maryland farmers for 34 different products and annual prices for several additional products. An index number of the composite series is also presented.

Such data are not only of value from a historical viewpoint, but they are of especial value to agricultural statisticians and economists who are interested in studying the inter-relationships between supply, demand, and price.

"Wheat," Agr. Exp. Sta., Berkeley, Calif. Bul. 502, Nov., 1930, E. W. Braun.

"Buying Tomatoes on Grade 1929," Agr Exp. Sta., Lafayette, Ind., Bul. 336, Feb. 1930, Fay C. Gaylord and John H. MacGillivray.

"Principles of Farm Management," Univ. of Me., Orono, Me., Bul. 192, May, 1930, Donald W. Reed.

"Part-time Farming in Massachusetts," Agr. Exp. Sta., Amherst, Mass., Bul. 266, Oct., 1930, David Rozman.

"A Bibliography of the History of Agriculture in the United States," U. S. D. A., Washington, D. C., Misc. Pub. 84, Nov., 1930, Everett E. Edwards.

Diseases

One of the most important publications on the diseases of a major crop appearing recently is the new Bulletin 354, "Corn Diseases in Illinois, Their Extent, Nature, and Control." The authors, Benjamin Koehler and James R. Holbert, have compiled their data with graphs, illustrations, and colored plates into about as complete a volume on the diseases of corn as is to be found anywhere. The bulletin should find its way into a great many reference libraries, as well as into the hand of corn growers. There are several instances cited where fertilizers play an important part in disease control.

"Virus Diseases of Tobacco in Kentucky," Agr. Exp. Sta., Lexington, Ky., Res. Bul. 306, June, 1930, E. M. Johnson.

"Control of Common Diseases of Stone Fruits in New Hampshire," Univ. of N. H., Durham, N. H., Ext. Cir. 111, May, 1930, Stuart Dunn.

"Control of Cane-fruit Diseases in New Hampshire," Univ. of N. H., Durham, N. H., Ext. Cir. 114, Oct., 1930, L. P. Latimer and Stuart Dunn.

"Combatting Stamping-off of Tomatoes by Seed Treatment," Agr. Exp. Sta., Geneva, N. Y., Bul. 586, Oct., 1930, James G. Horsfall.

"Seed Treatment Reduces Loss from Plant Diseases," U. S. D. A., Washington, D. C., Misc. Pub. 94, Nov., 1930, F. C. Meier.

Roosevelt's Life Policy

Do what you can, with what you have, where you are.

IDAHO POTATOES BEING WASHED BEFORE MARKETING

The practice of washing potatoes before marketing is reported to be increasing in the West. Seymour Jones, Oregon State Market Agent, says that "in some parts of Idaho the potatoes are washed and dried before shipment, and it is claimed that 400 carloads have been thus treated so far this season. Potatoes undergoing this process are beautifully bright and clean, but they must be disposed of quickly in order to avoid deterioration, as they are subject to many unfavorable possibilities after washing."—*M. A.*

TENNESSEE SEES PROFIT FOR LOW-PRICED PRODUCERS

"Cotton growers must get high yields at low cost in order to profit," the University of Tennessee is telling producers in that state. "Cotton growers," according to the announcement, "who produce above average yields of quality cotton at low cost may expect fair returns for their labor and land this year but those who produce below average yields of low grades will receive low returns for their labor.—*Marketing Activities, January* 21 *and* 28, 1931.

The Rots of Corn

(*From page* 22)

crosses of inbred strains.

Even though resistance to these diseases is not dominant it would be possible to obtain strains which are pure for resistance and hybrids between unrelated inbreds would give hybrid vigor and also show this resistance. Where these root rots are important diseases the inbred strains that are being used for developing new varieties should be subjected to these diseases and their resistance determined.

The first important step in control is better field management, crop rotation, fertilization, and sanitation. For example, wheat should neither precede nor follow corn in the corn-wheat sections, because of scab fungus. The cleaning up of old corn-stalks will get rid of a large source of infection. Good seedbed preparation with sufficient plant food material in a balanced condition and correct time of planting will help greatly in reducing the amount of disease. Under optimum corn production conditions, root rot does not affect the yield if the seed is viable.

Of next importance is seed selection. Growers should not select ears for seed from infected stock. Only ears that ripen naturally on stalks that do not die prematurely and stalks that do not fall over should be used for seed. The selection of plants with erect ripened ears and green tops has been an effective means of getting rid of the different rots. Internal cob-discoloration is associated with the corn rots and reduced yield. This kind of seed should not be used.

Artificial curing of seeds has helped greatly in reducing the amount of disease. Seed should be selected as early as possible in the fall and the moisture gotten out of it as quickly as possible. Drying the kernel helps to protect against the fungus invading the scutellum.

The next step in combating these diseases is to conduct a germination test. It has been shown that early vigor and yield are closely associated. The use of the modified rag-doll or sawdust-box tester by which ears can be individually tested for not only ability to grow, but freedom from disease, is recommended. Many diseased

ears can be weeded out from the seed supply.

The treatment of seed with organic mercury dusts has helped in mild cases of infection and in springs of cold, wet weather. Wherever these diseases are suspected the dusts are worthy of trial.

The addition of plant food in the form of commercial fertilizer has consistently been of great value and, applications of potash have given excellent results with diseased corn. Plenty of potash in the fertilizer for corn will help materially in reducing damage due to the corn rot troubles.

Weedless Pastures

(*From page* 28)

applied. The expense should not be very great, and if this simple treatment doubles the carrying capacity of the land, it will prove a mighty good business proposition, for at small cost the pasture acreage has been doubled, and without the expenditure of a single nickel for taxes.

But lime and fertilizers do not tell the whole story, since pasture management plays an important part in coping with the weed problem. The most serious mistake in handling pastures is not over-grazing, as many farmers contend. The experiments of Carrier and Oakley of the Virginia Station indicate that over-grazing is almost impossible because animals will starve before grass is seriously hurt. Turning the livestock into the pasture too early in the spring before the grass has obtained a good start is the common error that results in much killing of the tender succulent grass, the place of which is soon taken by hardy weeds.

There is also a logical theory that close pasturing in early fall is detrimental. Let us keep in mind that plants manufacture plant food elements in the leafy parts of the plant. Perennials send a portion of the plant food back to the roots to strengthen them so that they may endure the winter or dormant period. Removing the livestock in early fall in order that fall growth of the leaves may be sufficient to store an adequate quantity of plant food in the roots is desirable. If this grass is bluegrass, it will make excellent pasture for late fall and early winter at which time the grazing can be continued.

In addition to lime and fertilizer as weapons that the farmers should use in driving out the weeds, clipping

Pasturing too close in early spring and early fall may prove detrimental to the grass.

should be practiced. Clipping will not only prevent obnoxious plants from forming seed but will also keep them in check by reducing their leaf surface. Mowing should be done twice a year. The first cutting should be made in June at which time the plants should be cut high, some six inches from the ground. A single mowing, however, is of little avail against such weeds as chicory and wild carrot, because these species have a habit of maturing a second crop of flowers and seed so close to the ground as to be out of reach of the sickle. This can frequently be corrected by cutting about six inches of stubble the first time, leaving a tall stubble on which the second crop of blossoms will form. As soon as the second crop is in blossom, mow close to the ground and the chances are that a third crop cannot set seed before frost.

Where pastures are infested with scattered specimens of heavy-rooted plants as ironweed, dock, and mullen, digging with a spade to cut the fleshy root is a practical means of control. The spud, a chisel-shaped implement, is probably the most satisfactory for the eradication of burdock and plants of that type. A farmer in Clallam county, Washington, devised an implement to be used in eradicating sedges that was very satisfactory. The implement was made much like a dirt scraper only it consisted of a blade or cutting edge that cut under and uprooted the plant. Two horses were used to supply power.

When it comes to eradicating perennial weeds with creeping rootstalks, more drastic means must be applied. It is true, however, that a good stand of grass will hold even Canada thistle and field bindweed in check. In most cases they are not killed but are kept dormant and do not spread. Where these weeds are confined to patches, they should be sprayed with chlorates. One or two applications of the spray should be sufficient to kill the roots and do away with the source of infestation. As the chemical kills all types of vegetation, it will be necessary to reseed the treated areas to grass after the chemical has completed its action. The soil should be back in a fertile state some six months after spraying.

Another method that has been very successful is to salt the livestock on the weed patches. The combined effects of the salt and tramping will cause the hardiest of weeds to "give up the ghost."

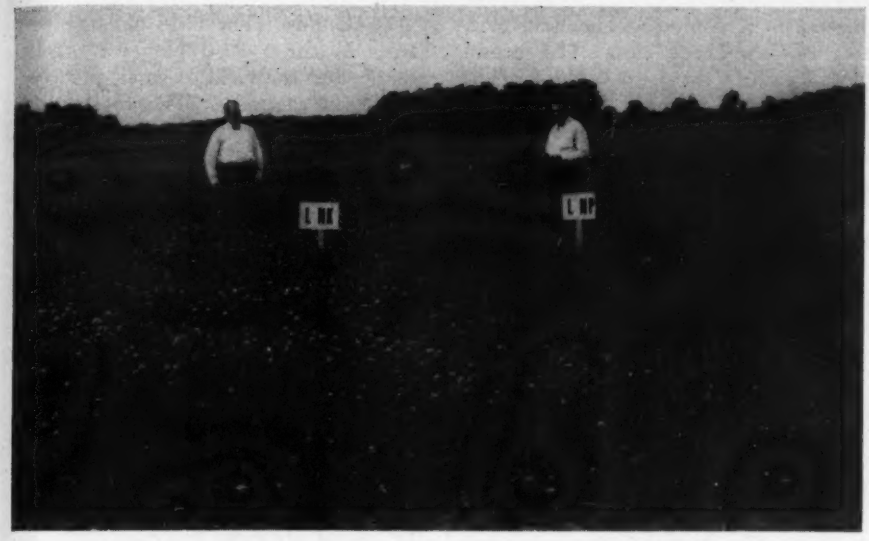
Under present conditions the pasture crop is the most neglected of all crops. There are altogether too many so-called pastures that furnish little aside from exercise for the livestock. If in too bad shape to warrant reclaiming, allowing the land to go back to forest trees may furnish a solution to the problem. A farmer can ill afford to pay taxes on land that does not bring returns, and only by making every acre pay can he hope to make the most of his farm.

Clover Needs Potash

(*From page 26*)

very small amount of clover. The ground not growing clover did not lie bare by any matter of means; the weeds came right in and claimed it. The yields given, however, are for the clover actually produced, the estimated yield of weeds having been deducted.

For 1930, the story is quite different. The young clover died on all plots except those where the treatments included either potash or manure. It will be seen that neither lime nor inoculation separately, nor a combination of the two of them insured



the stand of clover unless to this combination, potash or manure was added.

Manure is comparatively high in potash, and using the common analysis given for manure, about 80 pounds of actual potash were applied to the manure plots every two years or considerably more than was applied in the commercial muriate of potash.

It is also evident that no combination of inoculation, lime, nitrogen, and phosphorus was able to carry the young clover through the drought of July and August of 1929. On the other hand, lime, inoculation, and potash or some potash carrier were able to turn the trick.

Nothing so disrupts the sandy soil farmer's livestock and crop program as a failure of his clover to catch. The fact that potash pushes the clover "over the hump" on soils of this character is a distinct contribution to our knowledge of how to insure success. The residual effect of the clover produced as a result of the potash treatment is very marked, but that is another story which will follow at a later date.

A First-Prize Show

(*From page 29*)

Geo.—Well that certainly was too bad.

Sam.—Are you still raising potatoes?

Geo.—Yes.

Sam.—Well, how did they turn out for you.

Geo.—I got very good results this year.

Sam.—How is that?

Geo.—I am a member of the Riverside Potato club in Pierce county. Our club decided to have a fertilizer demonstration in order to see the value of certain kinds of fertilizers for potatoes. I had an acre of land that I was going to plant in potatoes so I measured off four-tenths of an acre for the fertilizer plots. (Indicates with hand.) Then I divided it into four

one-tenth acre plots. The first plot, I called "the check plot." The second plot, I called "the 3-10-0 plot." The third plot, I named "the 3-10-10 plot." And the last or fourth plot, I called "the 3-10-15 plot." (Divides plots with strings).

Sam.—Well, why do you call the first plot "the check plot"?

Geo.—Because it is the plot I check the value of the other plots by.

Sam.—Well, what is this 3-10-0, what does it mean?

Geo.—The "3" represents 3% nitrogen, the "10" represents 10% phosphoric acid, and the "0" represents 0% potash. Do you see that?

Sam.—Yes, but what's this 3-10-10?

Geo.—The 3-10-10 has one more element than the 3-10-0. This element is the potash of which there is 10% as shown in the formula. Do you see that?

Sam.—Yes.

Geo.—The 3-10-15 in this fourth plot has 5% more potash than the third plot. Now in the first plot or check plot I didn't use any fertilizer at all, but on the second plots I used 100 pounds of 3-10-0 making 1,000 pounds per acre. This application would cost $21 per acre. In applying it I watched to see that I got it on evenly over the plot. The third plot I fertilized with 100 pounds of 3-10-10, making 1,000 pounds per acre. On this plot I also watched to see that I got it on evenly over the plot. This application would cost $25 per acre. Then the last plot I fertilized with 100 pounds of 3-10-15, making 1,000 pounds per acre. This application would cost $28 per acre. (Applies fertilizer from small sacks.)

Sam.—What results did you get?

Geo.—In the check plot the yield of large potatoes per acre was 6,240 pounds. This represents the yield of large potatoes. The yield of small potatoes was 3,180 pounds. This pile represents the yield of small potatoes in the check plot. The total yield was 9,420 pounds. The yield of large potatoes in the 3-10-0 plot was 8,910 pounds and the yield of small potatoes was 2,520 pounds. The total yield was 11,430 pounds. These represent the yields in the 3-10-0 plot. (Points to piles of potatoes.) Now you can see the difference in the yields. You see the yield of large potatoes is increased by the use of 3-10-0 and the yield of small potatoes is decreased.

Sam.—Yes, I see that.

Geo.—In the 3-10-10 plot the yield of large potatoes was 9,000 pounds and the yield of small potatoes was 1,920 pounds. The total yield in this plot was 10,920 pounds. These two piles of potatoes represent the yield of large and small potatoes. Now, by the use of stronger fertilizer you can see that the yield of large potatoes is increased and the yield of small potatoes is decreasing.

Sam.—Yes, I see that.

Geo.—In the last plot or the 3-10-15 plot the yield of large potatoes was 9,828 pounds. This represents the yield of large potatoes in this plot. The yield of small potatoes was 2,064 pounds. The total yield was 11,892 pounds. So there you see the 3-10-15 is the best.

Sam.—How would this fertilizer be for cabbages or lettuce?

Geo.—This fertilizer does not apply to leafy plants because it has too much potash and not enough nitrogen. Leafy plants need plenty of nitrogen. I would recommend a 6-8-6 for your cabbages or lettuce.

Sam.—Did the fertilizer pay for itself?

Geo.—Yes, it did. Figuring at $40 per ton for large potatoes and $10 a ton for small potatoes, the market value in the check plot was $140.70. In the 3-10-0 plot the market value was $190.80. After subtracting the cost of the fertilizer which was $21.00, the net profit from the fertilizer was $29.10. In the third plot or the 3-10-10 plot the market value was $189.60; after deducting the cost

of the fertilizer which was $25, the net profit was $24.90. The fourth plot had a market value of $206.88. After deducting $28.00 for fertilizer, the net profit was $38.18. So there you see the 3-10-15 is the best kind of fertilizer for potatoes.

Sam.—Yes, I see that. I guess I will have to try it next year. Well, I have to be going.

Geo.—If you need any help or information on it, just come around. So long.

Sam.—So long. (Shake hands.)

Another exceptionally convincing fertilizer demonstration on potatoes was completed by Karl Baur of the Kelly Lake community, but the yield figures were not available for use at the Fairs, since the harvest was later in the season. The crop was planted on a soil containing a large proportion of muck. The complete results are given here.

Fertilizer Treatment	Yield per acre Market Size	Culls	Profit per Acre from Fertilizer
200 lbs. Sulfate Potash	6,920	1,180	$27.85
1,000 lbs. Complete 5-10-10 fertilizer	11,560	1,660	97.55
1,000 lbs. Complete 5-10-10 fertilizer with 200 lbs. sulfate of potash	15,090	1,820	156.05
No fertilizer	5,180	870	.....

These young farmers have carried their work through to a worth while finish, and there is no doubt they have proven to their satisfaction and the satisfaction of many other growers, that fertilizers high in potash bring potato profits.

Little Aroostook

(*From page* 30)

the material is wasted and to have it in proper balance for growing the plants in the best manner.

We are using a 5-8-7 fertilizer at the rate of one ton per acre as a standard application on the check plots in this experiment. In varying the elements for the other treatments, when one is varied the other two remain constant. For example, there are two variations for phosphorus, 5-0-7 and 5-16-7. These can be compared directly with the 5-8-7 check plots. Potash is varied with a 5-8-0, a 5-8-3, and a 5-8-10, and in the nitrogen plots we have an 0-8-7 and an 8-8-7. These variations in time should throw some light on the proper formula for potatoes, at least on that type of soil, with its particular historical background.

There must be, in the very nature of things, good reasons why a crop responds in one way to a deficiency or excess of a certain element on a given soil type and in another way on another soil type. The plant food already in the soil inherited from nature and the treatment it has had for decades or in some cases even centuries must have their bearing in the matter. This field has been included in the dairy rotation practiced on the Jackson farm for many years. Even though the land has not been plowed often, it is customary for the dairymen in the Colebrook area to top-dress their hay land annually, if possible, with barnyard manure. This practice must have considerable influence on the work that we are now doing, and may partially explain the effects which we are now getting from our fertilizers in this experiment. It may also serve to indicate why our responses differ in many respects from the results obtained by the Maine Experiment Station in the Aroostook area.

Fertilizers are applied only to the potatoes in this rotation experiment. One ton of fertilizer is the application used on all treatments, except on one series which gets 3,000 pounds of a 5-8-7 and another on which 1,000 pounds of the same material is applied.

Two years' results have been obtained from the plots. Check plot yields have been maintained at a fairly high level, averaging almost 400 bushels per acre for the two seasons.

Omitting the potash from the potatoes in the 5-8-0 formula has depressed yields more than leaving out phosphorus in the 5-0-7 or nitrogen in the 0-8-7 series.

The results for nitrogen might be forecast, as the soil is undoubtedly high in organic matter. But as manure is relatively high in potash also we might expect the plots where that element is omitted to respond somewhat more favorably than they do.

Expressing the yield of the check plots as 100, we get a relative yield of 69 for no potash, 80 for no phosphorus, and 92 for no nitrogen. With the exception of the element omitted, the amounts of the other two elements are held constant with those of the check plots.

Reducing the potash to three per cent, as we have in the 5-8-3 plots, reduces the yield to 91 as compared with the check plots. By increasing the potash to 10 per cent, which has been done in the 5-8-10, we have secured a comparative yield of 107.

Increasing the phosphorus in the 5-16-7 has given these plots a rating of 115.

A fertilizer of this formula merely means adding one-half ton of 16 per cent superphosphate per acre to one ton of 5-8-7. It is rather interesting that in these studies, to date, making such an application has given us more potatoes than putting on an extra half ton of 5-8-7 as has been done in the 3,000-pound plots. The 3,000-pound plots have a rating of 112, while the plots receiving 1,000 pounds of a 5-8-7 have so far yielded 82 on a comparative basis.

Increasing the nitrogen to an 8-8-7 has had no significant effect on yields up to the present. It should be remembered that in this work the phosphorus in our 5-16-7 has been doubled over the 5-8-7 whereas the potash and nitrogen have been increased only about 50 per cent in the 5-8-10 and the 8-8-7. What the rating of potash plots on a 5-8-14 level would be, we can only guess. But it is doubtful if nitrogen, increased to a 10-8-7 would show any appreciable gain over the check plots in the light of present results and taking the past history of

Left: One ton per acre of 5-8-0 yielded 196 bushels. Below: One ton per acre of 5-16-7 yielded 488 bushels per acre.

("We do not have a picture of the 5-8-7 plots. However, it would not differ materially from that of the 5-16-7."—*Ford S. Prince.*)

the soil into consideration.

In comparison with the series of plots getting no potash, there is a corresponding series with a two-ton application of lime. Last year is the first year that potatoes have been grown on the limed plots, consequently there is but one yield to report from them. The yields from these two series compared with the check plot yields for 1930 are as follows:

Treatment	*Rating*
Check plots	100
5-8-0	71
Lime and 5-8-0	55

Yields for one year in work like this probably mean nothing, yet we are inclined to place some confidence in these figures particularly because the two series of 5-8-0 plots, with and without lime, were contiguous in the field. This would tend, at least, to eliminate soil variations.

We have noted in another article on alfalfa fertilization how an excess of lime apparently reduced alfalfa yields where chemicals were not used in top-dressing. Here is another crop, as sensitive to lack of potash as alfalfa, responding adversely to liming. This is not necessarily an indictment against lime, but merely an indication that introducing lime into the soil causes chemical reactions there that throw available potash out of solution and render it unavailable for plant growth. The use of lime may indeed tend to increase the necessity for potash applications upon those crops that depend particularly upon that element.

The use of lime in any form upon land that will be planted to potatoes in the near future should be attended with great caution on account of danger from potato scab. On this soil which is well buffered two tons of ground limestone has brought the Ph up from about 5.0 to 5.5 and even at this point potato scab appeared in abundance on the limed plots in 1930.

From the practical viewpoint, lime should be used in a potato rotation only when clovers fail. When this does occur, it is probably better to keep lime applications small enough to encourage clover growth, but not large enough to make a great change in the Ph value. Alsike clover is being used in this rotation because it will make a somewhat better growth on acid land than red clover.

Lime has had a beneficial effect on both oats and clover in this experiment. Clover has responded with larger increases than oats but both appear to be significant.

No fertilizers are applied directly for either oats or hay. The residual effects of the fertilizers applied for potatoes are small when checked up on the forage crops in the rotation. The no-phosphorus plots appear to be depressed in yield but aside from this observation little of significance has developed thus far.

Controlled Weeds

As a demonstration in controlling quack or witch grass this experiment has been well worth while. The soil for potatoes is plowed immediately after haying, when the food reserves in the quack grass roots are at a low ebb. Following this, the land is harrowed every 10 days or so with a quack grass harrow through the fall and continued once or twice in the spring if necessary. Although there are but a half dozen of these harrows in New Hampshire at present, they appear to be very effective in tearing out and combating quack grass, and leave the soil in a nice, mellow condition for the potato crop.

The results for this test so far have been published in the New Hampshire Station reports for 1929 and 1930. Future work will also be listed there.

Whether the results of other years will be like those here reported is anybody's guess. If they are, it is quite possible that new potato fertilizer formulae will be developed, particularly in this important producing area.

Invest in Pastures

(*From page 15*)

That with the aid of commercial fertilizers such lands can be quickly made to yield luxuriantly is demonstrated by what farmers of Marinette county, Wisconsin, for example, have accomplished. Ten years ago dairying was fading as an important industry of that county. At that time almost as much feed was shipped into this locality as was grown. Then a few progressive farmers began to use fertilizers to dress their meadows. They saw immediately that it not only improved their meadows but likewise made other crops of the rotation yield better. Today the use of fertilizers has become a standard practice on nearly every farm and the county has become as prosperous as any in the state. Today this county is an export rather than an importing feed section.

If a cow could tell what she knows about the benefits to be derived from fertilized pasture, she undoubtedly would say, "It is ready to graze earlier in the spring by a week or two. This gives me more pasture days. Fertilized pasture withstands summer dry weather better. I, therefore, have better grazing in seasons of drought. But, best of all, well-nourished pasture tastes better and satisfies." She will prove her point too, if with her calf she is put on the scale or her milk is weighed and tested.

The use of fertilizer is not an expense. What is spent for plant food to increase yields is paid back with dividends. Such an investment offers no parallel in the way of both immediate and permanent creation of wealth. At present the need of pasture improvement is of paramount importance, for the United States Department of Agriculture reports the conditions of meadows at present as 59 per cent of normal.

The Time to Fertilize

Late fall or early spring is the time to treat pastures. If the soil is sour it should be limed. Then a good high grade fertilizer should be broadcast. All meadows respond to nitrogen, 90 out of 100 are hungry for available phosphoric acid, and potash is especially beneficial where clover makes up a part of the herbage. Hence, a generous application of a complete formula containing all of these essential plant-food elements will be no gamble.

Paul Strickler, Centerville, Iowa, dairy farmer, points out you can even employ fertilizer to kill sprouts in your meadow. He says:

"Last fall I had a pasture near the woods on which there was considerable hazel brush. We cut the brush in the fall and then early this spring broadcast some complete fertilizer over a portion of the meadow. Soon after applying the plant food, we noticed that the grass responded, but so did the brush sprouts. Of course, there

Both cattle and hogs make most economical gains on well-fertilized pasture.

were brush sprouts where no fertilizer was applied as well as where we applied the plant food. However, the sprouts on the treated part of the meadow were of a much darker color. When we turned our cows into the meadow they sought the fertilized area and grazed both grass and brush sprouts down to the roots. Meantime, the sprouts on the unfertilized part of the pasture remained untouched and grew woody. The result is that we now have an improved, clean pasture where we applied fertilizer, whereas the hazel brush still decorates the rest of the meadow."

The Farm and Home Garden

(*From page* 12)

portant a factor to the home gardener as to the commercial grower, however.

Experimental results seem to indicate that mulch paper is of greatest value when used in growing of early, quick maturing crops, warm-season crops, and in conserving moisture in periods of drought.

The most suitable way to use the paper in the home garden is to place it between the rows of vegetables covering the entire area. The paper must be anchored. Covering the entire edge of the paper with a couple inches of soil will prove a satisfactory method of holding it in place. The edges should come close to the planted row, thus almost entirely eliminating the growth of weeds.

Seedlings Need Care

Seedling plants started in boxes, hotbeds, or coldframes should be transplanted when they are one to two inches high. Plants of this size transplant more readily, make stockier plants, and develop better root systems, all resulting in earlier maturity and higher quality vegetables. Spindling plants are usually the result of crowding, too much water, or lack of light.

In setting plants in the garden, water plants 12 hours ahead of transplanting. Use care in keeping as much dirt on roots as possible and set plants in freshly made holes.

Most home gardeners plant seed too thick. Thinning to proper distances will hasten maturity, increase yields, and insure higher quality. The best time to thin seedlings is shortly after they are up. Onions, beets, carrots, and parsnips should be thinned when plants are small to prevent disturbance of root systems.

An abundance of humus or decaying organic material, plant food, and water are prime requisites for a real home garden. When watering either with hose or other means of irrigation, soak the soil thoroughly. During periods of extreme drought, watering in evening is most beneficial. Light sprinkling in dry, hot weather usually does more harm than good.

In order to care for fall and winter needs, it is best to make special July plantings of root crops rather than depend upon those started earlier which have passed maturity and consequently are of poor quality.

Late potatoes in the Midwest may be planted from July 1 to July 15 with a fair degree of success. In the region as far south as southern Indiana, they may be planted as late as July 15. Only certified Rurals, Ohios, or Cobblers should be planted, and on most farms certified Rurals will do best as sources for the winter's supply.

Late celery plants of the varieties Easy Bleaching, Golden Self Blanching, or Giant Pascal should be planted not later than July 10. Plants may be placed four inches apart in the row and rows three feet apart for horse cultivation. In growing late celery it is of greatest importance that the plants be placed on soil of the highest fertility. Where possible black

loam soil is best. After the celery plants are five to eight inches tall, they may be side-dressed with an application of barnyard manure or another application of high-grade, complete fertilizer.

Detroit Dark Red beets, Danvers Half Long carrots, Danish Ball Head cabbage or Wisconsin Yellows Resistant Hollander, where yellows is troublesome, should be planted in midsummer to give excellent quality for winter. During the last half of July, Purple Top Globe turnip seed should be sown in abundance.

A July planting of stringless green pod beans, leaf lettuce, and parsley may be planted to give fall crops and the last tempting reminder of the joys of summer before winter sets in.

For city people the garden will help reduce food costs and act as an excellent immunizer against any form of "golfitis." The farm garden will help to keep the labor on the farm and the cash in the bank. Nothing can take the place of the country, summertime, big dinners, and how can you have 'em without fresh green peas, sweet, juicy corn on the cob, piles of red-ripe tomatoes, not to mention the hosts of other vegetables that make the memory of country dinners linger on.

If you want definite information—your County Agricultural Agent or Agricultural College will be glad to send you complete plans and helps for the home and farm garden. They will give in detail, cultural directions, best varieties, and other information which will help you in making your garden a real one. Why not plan so you can brag later about that wonderful garden, even though your wife does the work?

Potash Insures Tomato Quality

(*From page* 8)

equivalent of a minimum carload. They have never had any trouble with their tomatoes or other truck crops "going bad" in transit for they are properly grown, graded, wrapped, and packed, and arrive at destination in prime condition. Their fleet of trucks operates between the South Georgia points mentioned above and New York City. However, they have built up such a great demand for their high quality tomatoes that their trucks seldom get north of Washington, D. C., before they are sold out.

A careful study of vegetable markets in past years clearly reveals that prices are higher in the smaller towns where solid carloads of tomatoes or other perishables are not shipped directly. This condition exists for the reason that the small markets must pay the cost of redistribution that the terminal centers are not called upon to bear. For instance, the retail price of lettuce in Griffin, Georgia, (40 miles from Atlanta) is usually higher than the Atlanta market because the Imperial Valley Growers of California know that Griffin cannot consume lettuce in carlot quantities and therefore they ship through Atlanta wholesalers who must, rightfully, have their redistribution cost.

This condition makes the trucks very valuable as a means of transportation for vegetables, for they can unload from 10 to 50 crates in a town where prices are higher than in terminal centers. Trucks carry mixed cars at a flat rate while railroads require a mixed car of vegetables to carry the highest rate called for by any one vegetable that the cars contain.

Mr. Royal reports that they can deliver tomatoes in New York City in 45 hours and that all their shipments have arrived in excellent condition. However, they are going to specialize

in towns of less than carlot consumption where prices are better.

The experience of the Seaboard Farms and the Georgia Vegetable Growers Association is typical of what is going on down in Dixie. During this reconstruction and readjustment, many farmers will sustain heavy losses and perhaps a few will pass out of the picture entirely, particularly those who cling tenaciously to old systems, methods, and practices and refuse to adopt new standards or employ modern equipment. Out of this upheaval will come a self-sustaining agriculture that will make country life in the South as much to be desired, as comfortable, and as independent as was the plantation life in colonial days.

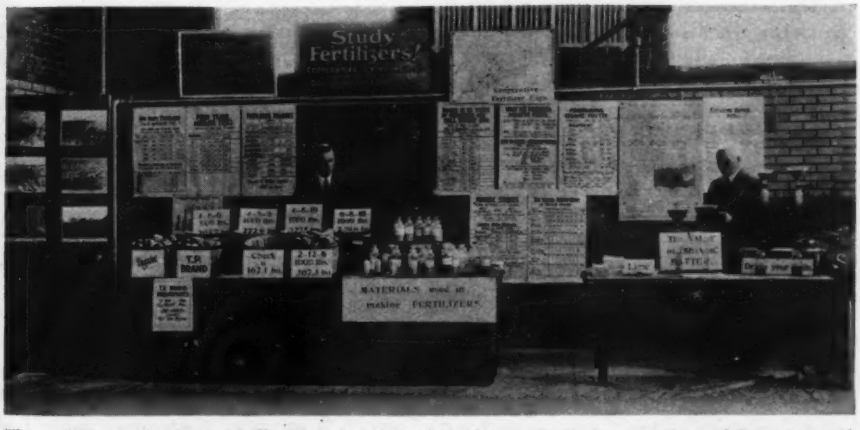
Knowledge Is Power

(*From page 19*)

Chemistry through its extension service is likewise taking its work to the farmers of the province by its system of field demonstrations.

As already mentioned the Department of Chemistry in its extension work has held meetings in several centers where interesting demonstrations have been maintained. In addition to this the facts concerning various field demonstrations are supplied to the local and provincial press. By these means results reach the farmer many times during the period while the demonstrations are still standing. This leads to more visits to the demonstrations and closer examinations of the tests. During the growing season the Department has made a feature of keeping its demonstrations advertised by placing suitable signs where these demonstrations are being carried out. Through this means farmers have been enabled to watch the results of soil treatments throughout the summer and have taken a special interest in locations where field meetings have been held.

Following the growing season the results are compiled in pamphlet form. Other avenues of dissemination of this information include exhibits at the world-famed C.N.E. where last year the Department of Chemistry featured its soil studies. At several county fairs, local exhibit-demonstrations brought facts of value to the attention of the attendants at the fairs. On such occasions many questions of local inter-



This exhibit at the Bowmanville, Ontario, 1930, fair is typical of the extension exhibits presented at fall fairs.

est were discussed. The object of the field-demonstration work is to take to farmers in all parts of the country, valuable information which has been gathered by the Department of Chemistry.

Veritas

(*From page* 4)

embalmed bit of imagination that hurts any nation's integrity. We would rather swallow a few fables in history than listen to so much cant and hypocrisy in the public forum.

We probably know what truth is in the abstract, if not in specific doses. Truth is either a fact or a condition that exists, or it is a principle. Facts and conditions move and change, but we like to regard principles as fixed or established by the *mores* of the common thought.

As we can't be everywhere when facts happen or conditions arise, somebody else has to pass them on to us, if they choose, by written or spoken words. Yet as we know from court testimony, as well as newspaper garbling, two or more persons on the scene of action may not agree in detail as to what occurred.

So truth, if come by either in person or through proxy, stands a mighty big, human chance of distortion or misunderstanding. I often think that animals and birds, within the limits of their meager intelligence, arrive at truth in their own world and ours a trifle better than we do. Perhaps it's the human ego that interferes, or is it that we have imagination and lower forms of life lack it?

I am no different than the average. I am often nonplussed and distraught by the multitude of alleged truths, facts and near-facts, conditions and theories, that enter into every hour of my consciousness. We get them in great gobs of domestic and foreign news, by radio, by conversation, and by telephone. Even on the "Day of Rest" our doors are assailed by carriers with weighty budgets of assorted entertainment, information, conjecture; and thorns of unrest prickle our Sabbath hours of ease. We are not allowed to forget Monday, or tax time, or the threat of Communism during the supposed hours of domestic bliss. Any modern man who can find a quiet retreat where he can think of nothing is a fortunate citizen indeed, if he is still at liberty. They seek you out in summer resorts and install radios in your hotel chambers.

Verily, the "isolated farmer" is as scarce as red flannels and chin whiskers in the silo sections. The "forlorn apprentice" of Hogarth's day now owns his tuning-in apparatus and takes his daily paper. Imbibing what we call truth is a mania, although I do not call it a menace.

When our forebears forded streams and hewed logs in the game afterwards called "empire building" at Kiwanis luncheons, there were different conditions. A relatively narrow environment and slow modes of communication resulted in fewer facts and less complex conditions touching the minds of the men. They had to do with handling the rough and heavy stones of the foundation, not being agitated or perplexed with choosing fine points of trimming in the superstructure. The creators of a thing often are less finicky than those who undertake reforming or repairing.

Turning now to the greatest outcome of truth, we acknowledge that it must be *opinions*. This is true, because unless we first make up our minds, we can't very well act on anything. Opinions are determined by what brand of truth we absorb, if any. Nowadays there may be a *few* folks who won't absorb any facts or

see any conditions, and of course, they have no opinions.

As I am an unlicensed sort of philosopher and a crude one at that, what I opine herein may jar the theories of some who have sat at the feet of the Masters. It's only another opinion anyhow, and subject to all the bias of anybody's convictions.

The pioneers above mentioned were adamant in many of their opinions because they were not overwhelmed or confused by any such mass of events and cross-currents as we face today. Therefore, they were usually willing to fight for them, take punishment for them, and possibly die for them. They are a legion in our history, those Mormons and moonshiners, those Free Soilers and Abolitionists, those Pro-Slavery men and those Nullificationists, as well as the "cults" and clans of free lovers and free thinkers.

RIGHT here I will tell you why I like to read John Brown's Body, by Stephen Vincent Benet. This poet laid broad hands on the lives of the great and the humble in a period of national turmoil when there were mighty clashes between men of opposite opinions. He did not traffic with any group or clique, nor did he rail at any of their weaknesses as some of our smart modern writers prefer to do. He took us into the lovely old Southern plantation houses and marched us along with the farmer boys from the North, showing us that the power of this country was welded in the heat of men's convictions, and remains a lasting tablet over some of their buried hopes. Lately he did something for Griffith's Lincoln movie, but I'd much rather see him embroider the histories we give to the children.

So as we scan their turbid lives, often bitter and poor, we sense the fact that they were above all else true to themselves and their beliefs. How many of us are able to say the same today?

We are not prone to cling with much fervor to our opinions and go tumbling into the ditch of battle for them. This is because changes are so rapid, conditions are so fluid, news and views are so varied as to crush any attempts to gain an even keel in the sea of our sentiment.

With more facts and more conditions and with more ways of reaching more people more quickly and simultaneously with the tidings, we are feeble in our reaction to them.

This is possibly why we find that the spectre of Intolerance wears so shabby a coat in this century of enlightenment. We forgave the intolerance of the Puritans or the Free-Soilers because they were of the pioneers and building the foundation. Possibly they were companions on the Cross with the thief of Calvary, and the worst of their shortcomings deserve an equally tolerant forgiveness.

BUT, let me ask you, in this day of swift change and lightning-like marvels, who is there willing to assume that the grain of truth seen through his microscope is the only atom on which conduct or conditions may be safely based? I am afraid that there are too many in high places who do this very thing.

When a bunch of us get organized in a society or a department or something equally satisfying and chummy, we get together and make rules of conduct that square with our sanctum ideals; and then we begin certain campaigns and movements to shake down the apples. Usually we don't stop long enough to study psychology or the general effect of our doctrine on the hinterland. What's ours must be right, so we go on with an eight-cylinder juggernaut driven by an unlicensed chauffeur who is color-blind.

In the meantime somebody on the sidewalk disagrees, which is human and according to the constitution. At once the fuse is set afire to blow that non-conformist higher than the latest altitude record. All the outlying

clansmen are given the burning brands to carry from peak to peak, issuing grave warnings against the bumptious individual who dared to put a questionmark in parenthesis into our sacred Magna Carta. And mayhap while we are thus nobly engaged, some worthy brother in the inner circle steals the altar and all the trimmings.

And unfortunately, friends, the worst offenders in the game of putting the non-conformist on the spot are our institutions of learning and our Departments of Official Interference. Although they have access to all the legion of philosophers and the index to all the screed of science, these chaps from whom we expect better guidance are the first to cast the rocks or braid the crown of thorns. When will higher education begin to make leaders instead of lashers?

AS long as education was content to sit on a log and be a humble tutor, his function was only limited by what truth he possessed to impart. But now, when education seeks to rule and order the universe, and requires seventy-five per cent of the public's budget to maintain its inquisition, we face a starvation of individual thought in the midst of a packing-town of provisions! We educate men to think for themselves and then penalize them if they sit up and take notice of anything that rattles in the world's omnibus. It's probably better to sleep along, and we'll get there just the same—with lilies and a good sermon at the end.

As a journalist, I was taught that accuracy first is the abiding principle of getting out a public chronicle. As a journalist I hope I escaped the blasé effect of finding out how much truth is only varnished opinion. We are all more or less open to the mistakes of the tyro journalist, which lie in getting the "copy" in the news page which really belongs in the editorial column. We want to be editors and molders of thought, which is part of the urge for expression born in us with the first squawk. Merely to relate is not so entrancing as to debate. Yet from experience I know that those who sell narratives get longer pedigrees in Who's Which than those content to argue.

DR. GLENN FRANK, into whose office I was once admitted after six weeks' appointment, pictures the fervid cub reporter as sorting carefully the sheep of truth from the goats of propaganda. It isn't quite logical, for most of our slickest headlines depend on an ounce of fact in a ton of tommy-rot, and if there were no propaganda used in newspapers the universities would be as empty as a football stadium in February.

Now propaganda is not pure quill imagination put to its choicest use. Propaganda is not always untruth either. It is the clever repetition of some truth with a sauce of fancy, a setting-up of idols that may breed intolerance or bring reforms. There is truth that hurts just as much as there is propaganda that harms.

We have somehow come to dislike the term "propaganda" while we have put a halo on truth, but the one may be as desirable to fit a condition or fill a need as the other. We can fool ourselves into happiness just as we can bewail ourselves into a sink of depression by telling too much of the truth. If some of the actual facts that get into print were left out and their places filled with a little harmless bunco I should not buy any horsewhip for the editor.

BUT despite all the vagaries that we have to contend with in order to be practical and "live with folks," there is in most of us an earnest desire to follow truth as a principle, even if facts *do* embarrass us sometimes. Only a misanthrope believes that the world

is all wrong and deliberately devilish.

I reckon we can sort of live the truth in a humble way if we don't let our ambitions outdistance our abilities. Just as soon as any of us with mediocre talent and bird-seed courage try to straddle too many giant jobs at one time, or imitate the culture of somebody who acquired it honestly, there is apt to be a sudden parting with truth as a living principle.

The man who tries to mix around and be ingratiating when he would rather sit in the attic and dream; the country-minded man who moves to town and tries to boss the ward; the preacher who ought to be a pee-wee golf expert; the woman social worker with a hen-pecked husband; and the essay writer who studied to be a chiropractor—these are all living examples of ones who misunderstood truth. They are not evil-doers.

And finally, there's where the shoe grinds the bunion for most of us. We are all more or less distant from the truth and probably will be as long as America is dedicated to individual initiative. But if we were all serfs there would be just one truth, and that would be dished out to us with a cat-o-nine-tails. When we die and go to glory, the curtain will part and we shall behold the original instead of the reflected imitation. Our part down here, I guess, is to shave as close as possible to the image we see in our own mirror of veracity and trust to luck to arrive at the pearly gates with a smooth chin.

New truths constantly appear and old texts are soon obsolete. What is taboo in this generation will be the mode of the next one. Hence I for one shall "wait with patience the race that is set before us," glad that each morning I will have the sense to open the shutters of my mind and put up my periscope, ready to let the spectrum of that day's new thought put a little vitamin into my scant stock of veritas.

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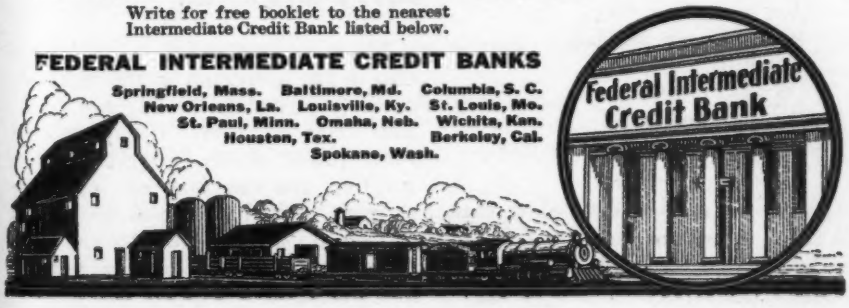

HOW'S YOUR BRAIN?

This is a trick—so don't say we didn't warn you. Read this sentence:

FEDERAL FUSES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS.

Now, count the F's in that sentence. Only once—don't go back and count them again.

Elsewhere on this page you'll find the answer, and it will tell you something about how good your brain is.

A minister, learning to play golf, suddenly remarked "I must give it up! I must give it up!"

"Give up what?" he was asked. "Golfing?"

"No, the ministry."

If a couple of men get along well, it's a sure thing their wives will dislike each other on sight.

A DIFFERENCE—YES

The gum-chewing girl
And the cud-chewing cow
Are somewhat alike,
But different somehow.
What difference?
Oh yes, I see it now;
It's the thoughtful
Look on the face of the cow.

Boss: "A man is never older than he feels. Now this morning I feel as fresh as a two-year-old!"

Steno (sweetly): "Horse or egg?"

REAL DIPLOMACY

A good customer was getting lax about the payment of invoices, and Abe suggested that Mawruss write him a strong but diplomatic letter calling his attention to this laxity.

Mawruss worked for several hours over the letter, then showed it to Abe for his approval. After reading it over carefully, Abe said: "By golly, dot's a wonderful letter. Strong and to der point and not personal or insulting. But you got a couple mistakes in it, Mawruss. 'Dirty' you should spell mit only one 'r' and 'cockroach' begins mit a 'c.' "—*The Clutch.*

Two little boys came into the dentist's office. One said to the dentist, "I want a tooth took out and I don't want no gas because I am in a hurry."

Dentist: "That's a brave boy. Which tooth is it?"

Little boy: "Show him your tooth, Albert."

The open cookie jar has built a halo big and lasting about the head of many a boy's mother.

There are six F's in the sentence you read in the paragraph in the first column. An average intelligence recollects three of them. If you spotted four, you're above average. If you got five, you can turn up your nose at most anybody. If you caught all six you're a genius, and a lot too good to be wasting your time on foolishness like this.

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Means Greater Prosperity in Your County

Every progressive farmer in your county is vitally interested in securing the greatest acre profits from each crop. Greater acre profits mean greater financial success for your farmers, greater prosperity in your county, and greater accomplishment for you in your field of endeavor.

In seeking the way to greater acre profits your farmers are constantly turning to you for advice on their problem. In your recommendations of best cultural practices for each crop, seed treatment for the control of seed-borne diseases has earned a definite place.

Each year seed-borne diseases are taking a tremendous toll from the farmers of this country—reducing acre profits by gigantic sums—200,000,000 bushels of grain; 500,000 bales of cotton; 80,000,000 bushels of corn; and 12,000,000 bushels of potatoes. Through the control of these preventable diseases by seed treatment, much of this loss can be turned to increased acre profits—and at a cost that is insignificant compared with the increased returns.

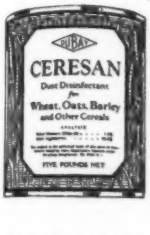
Field demonstrations prove conclusively that seed treatment pays its small cost many times over. We shall welcome an opportunity to cooperate with you in a seed treatment demonstration program for your county by furnishing you with a limited number of samples of Ceresan—for demonstrations in control of stinking smut or bunt of wheat or rye; smuts of oats; covered smut and stripe of barley; and anthracnose, angular leaf-spot, certain boll-rots, damping-off, and seed rotting of cotton,—if you will arrange with your growers for the demonstration plots.

As a further means of interesting the farmers in your county, our motion picture films on cereals, corn, potatoes, cotton, and vegetables, which show the common seed-borne diseases, the damage they do, and how easily they may be prevented by seed treatment, are available to you.

For samples of seed treatment—and for further information on our motion picture films—just fill in the coupon and send it to us.

BAYER-SEMESAN COMPANY

Bayer-Semesan Co.,
105 Hudson St., New York, N. Y.



I will demonstrate Ceresan on Barley, Cotton, Millet, Oats, Rye, Sorghums, Wheat.

Please send me samples for demonstrations. I agree to keep a record of each demonstration.

Also send me information on motion picture films.

Name:..... *Position:*.....

Address .....

The A-B-C's *of* Potash

CORN yielding at the rate of 100 bushels removes from each acre 35 pounds of actual potash, equal to 70 pounds of muriate of potash, or 350 pounds of fertilizer containing 10% potash. *Potash pays!*

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